STANDING COMMITTEE

ON

ECONOMIC DEVELOPMENT

ANNUAL REPORT

2005

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Printed and Published by the Queen's Printer
Halifax

ISSN: 1705-1533

This document is available on the Internet at
http://www.gov.ns.ca/legislature/committees/index.html

House of Assembly
Nova Scotia

Hon. Murray Scott
Speaker
House of Assembly
Province House
Halifax, Nova Scotia

Dear Mr. Speaker:

On behalf of the Standing Committee on Economic Development, I am pleased to submit the 2004 - 2005 Annual Report of the Committee for the First Session of the Fifty-Ninth General Assembly.

Respectfully submitted,

Mr. Michel P. Samson, MLA
(Richmond)
Chairman
Standing Committee on Economic Development

Halifax, Nova Scotia
2005

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Foreword

The report of the Standing Committee on Economic Development was written in accordance with the mandate of the committee.

The report is written under individual topics outlining the concerns and issues brought forth from each group / organization.

Mandate

For greater certainty, the Economic Development Committee is established for the purpose of considering matters normally assigned to or within the purview of the Department of Economic development and the Minister responsible for the Department and the Department and Minister of Transportation and Public Works and matters relating to the Technology and Science Secretariat.

ORGANIZATIONAL MEETING

WITNESSES

There was no organizational meeting of the standing committee since October 2003. At that time, the Standing Committee on Economic Development had formulated an extensive witness list to include such organizations and topics as Small Business Loans Program; Nova Scotia Federation of Agriculture; Atlantic Provinces Trucking Association; Western Valley Development Agency; Nova Scotia Power Inc.; Offshore Accord; Offshore Accord / OTANS; ACTRA / Directors Guild of Canada; Nova Scotia Business Inc./ Office of Economic Development and the Retail Gasoline Dealers Association of Nova Scotia.

A few of these witnesses were approved by the Standing Committee on Economic Development during their organizational meeting in October 2003, during several public committee meetings as the issues came up and as written requests by the witnesses themselves.

In the following sections of this report, the business of the above witnesses will be further detailed.

References to, and within, this transcript can be found on the Nova Scotia Government Web Site at: http://www.gov.ns.ca/legislature/hansard/comm/ed/ed_2003oct28.htm

SMALL BUSINESS LOANS PROGRAM

October 5, 2004

WITNESSES

Office of Economic Development
Mr. Jeff MacCallum – Corporate Strategist
Mr. Neal Conrad – Director of Rural Development

Credit Union Central of Nova Scotia
Mr. Bernie O'Neil – CEO

Nova Scotia Cooperative Council
Ms. Diane Kelderman - CEO

PRESENTATION

The credit union system in Nova Scotia serves about 169,000 Nova Scotians. Credit Union growth, over the past number of years have been on average 7 – 9 per cent per year and its assets are about $1.3 billion.

In 2003, credit unions returned in excess of $1 million to the province in the form of rebates based on the business done with credit unions. About 800 Nova Scotians are employed by credit unions and their salaries and wages in 2003 were in excess of $24 million – $0.5 million was invested back into staff and director training. Credit Unions are locally owned, managed and staffed with a primary responsibility to the local community. In 34 of these communities credit unions are the only full service financial institution available.

Community Investments

Credit Unions believe in investing in their communities. Such investments included sponsorship of the Canadian Cancer Society's Relay for Life, which raised over $880,000 in 2004; donations of about $350,000 to community development projects and charities and as a major sponsor of the recent Acadian Congress in Nova Scotia.

Credit unions also provide scholarships to community colleges and the College de l'Acadie and have a significant number of school programs. In 2003, credit unions injected over $3 million into local economies through the renovation, construction and technology purchases in their various offices.

Evaluation Recommendations

At the end of the first year of the Small Business Loans Program, the Province hired a consulting firm to do a formal evaluation of the first year's activities. Following are the six key recommendations that have come out of the evaluation program:

Continue with the program,
Investigate barriers to participation,
Determine whether or not there is an overlap of the program with other such programs,
Increase stakeholder awareness of the program,
Work with disadvantages groups, i.e. persons with disabilities, young entrepreneurs, and women,
Constantly improve baseline management.

MATTERS OF DISCUSSION

Although there were a number of issues discussed throughout the meeting, outlined below are a few of the key issues.

— Small Business / Financial Loans Program.

— Reasonable access to capital for small businesses.

— Increased commercial lending capacity.

— Loan Process.

— Number of Loans.

— Regional Breakdown of Loans.

— Program Evaluation.

— Mentoring Program.

— Clientele.

— Small Business Loans versus Bank Loans.

MOTIONS/RECOMMENDATIONS

During discussions of what was called a 'positive and well received' program, the Standing Committee has unanimously passed the following motion,

> "The Standing Committee on Economic Development enthusiastically supports the pilot small business loan program and ask that the Minister of Economic Development convert this program into a permanent program and promote the funds necessary for its sustainability and growth."

In response to the motion the Office of Economic Development forwarded the following:

> " The large uptake on the program is an indication of the need for this type of financing. The demand for financing under the program has exceeded initial expectations. Staff of Economic Development will be examining the options to meet the future needs of the program in cooperation with our credit union partners and making recommendations. Additional funding for the program will have to be considered in conjunction with the other budget priorities of the government at the time."

DOCUMENTATION

The Standing Committee on Economic Development requested the following information and documentation:

- A list of venture capital funding;

References to, and within, this transcript can be found on the Nova Scotia Government Web Site at: http://www.gov.ns.ca/legislature/hansard/comm/ed/ed_2004oct05.htm

NOVA SCOTIA FEDERATION OF AGRICULTURE

November 9, 2004

WITNESSES

Nova Scotia Federation of Agriculture
Mr. Laurence Nason – Chief Executive Officer
Mr. Kurt Sherman – Executive Director

PRESENTATION

The Nova Scotia Federation of Agriculture represents about 2, 200 farm business in Nova Scotia whose businesses account for over 95 per cent of the production.

The agricultural industry in Nova Scotia has been in crisis since 1997. Between 1996 and 2001, there were about 530 farm businesses in Nova Scotia that went out of business and statistics from 2001 to the end of 2004 are expected to show a similar, if not greater, number of farm businesses that have left the industry. The immediate and direct impact of the closure of Avon Foods was the loss of about 80 processing jobs and 55 seasonal jobs and the loss of market opportunity for approximately 45 primary producers.

The decision to shut down Avon Foods affected approximately 3,000 acres of agricultural land in the Valley and as the majority of the crops grown on this land were part of a three-year rotation, the total acreage that was impacted was about 9,000.

Remedial Measures

With respect to remedial measures, the long-term issue is the replacement of current crops with marketable alternatives and to ensure that the affected land remains in agricultural production. In the short-term, the issue is to find suitable crops for the land that has been impacted, to protect existing infrastructure, and to ensure that farm businesses that have been impacted have enough income to survive until alternative uses can be identified and developed.

Recommendations to the Provincial Government

The Federation suggested the following recommendations to the provincial government:

- to provide immediate assistance for those farm businesses who supplied Avon Foods,
- to establish a green manure fallow program that would provide those 40 – 45 producers with the cash flow to get an alternative crop in the ground,
- to consider a program that would enable the owners of some very specialized infrastructure, harvest, planting and storage equipment to maintain that infrastructure until alternate crops and uses could be developed.

The CAIS Program

The CAIS program, introduced as part of the agricultural policy framework, was to provide farm businesses with income stabilization and protection against disasters such as the closure of Avon Foods, BSE, market failures and uncontrollable weather events. The CAIS program is a combination of two programs, NISA, an income stabilization program, and CFIP, a disaster program.

In a release by the Department of Agriculture and Fisheries, 1, 138 farm businesses had joined the CAIS program in 2003. Of these, 211 applications have been processed and 121 payments have been made, one year later. Only 11 per cent of 2003 applicants have received payments in 2004.

Nova Scotia Beef Producers Program

In 2003, a government task force on BSE recommended that cattle producers in Nova Scotia required $400 to stay in business and to replace the equity they had lost in their herds. The government came up with what they called the Nova Scotia Beef Producer Enrolment Program. That program provided producers with a payment of $100 per cow; however, to qualify for the $100, producers had to join the government's CAIS program. Producers were told they would receive the other $300 in emergency assistance from the CAIS program. Although there were 723 producers who joined the program, the Federation is not aware of any producer in the province who received $300.

The Federation has discovered that the average accounting bill for the development of a CAIS application is approximately $700 and then there is a premium required to access the program.

Farm businesses that were impacted with the closure of Avon Foods were told the CAIS program was there for them. However, the program as it is now structured, is perceived to be of no use to these producers. There is the opportunity for the program to be amended through a federal-provincial agreement, and although the government has made a commitment to pursue the necessary change, but the Federation is not aware that the program changes have been made.

Livestock Industry – US Border Closing

On May 21, 2003, the U.S. border closed to Canadian cattle. The livestock industry in Nova Scotia has lost millions of dollars. As part of a strategy the Federation of Agriculture presented to the government, they suggested that the department put together an industry/government group who could examine how Nova Scotia can fit into the post-BSE situation.

Nova Scotia has a relatively small and agile cattle industry. It has a highly skilled group of livestock breeders who ship purebred livestock all over the world. Being comparatively isolated means problems can be contained relatively quickly and easily. Nova Scotia is well positioned with respect to two primary markets, the northeastern U.S., and Western Europe.

Some structural changes made to the industry. The complexity and size of the policy issues to be dealt with will require a commitment from the government to be successful in the planning process.

MATTERS OF DISCUSSION

Although there were a number of issues discussed throughout the meeting, outlined below are a few of the key issues.

— Livestock Policy Issue.

— Cattlemen's Association Grant.

— NAFTA.

— Protection of Farmland.

— Buy Nova Scotia.

— Water Resources.

Water supply is one of the most important issues that the industry has to deal with. The agricultural industry is totally dependent on abundant, clean sources of water. They are discovering that because they are a fairy large and visible industry that every time something happens to the water source they are suspect. It is going to require an investment on the part of the public and the industry to make sure that all can maintain clean abundant water for the agricultural community and the greater community.

MOTIONS/RECOMMENDATIONS

During discussions about the CAIS program in regard to the 60/40 formula on livestock the Standing Committee on Economic Development has unanimously passed the following motion:

> "To write to the provincial Minister of Agriculture and fisheries directing him, in consultation with the Federation of Agriculture, to use 40% of the dollars that would be attached to a federal program to develop a made-in-Nova Scotia solution to the CAIS program" and
>
> "To write to the Federal Minister of Agriculture requesting that the CAIS program be adjusted to reflect the situation in Nova Scotia that the livestock sector is facing and to adjust the program immediately".

DOCUMENTATION

There was no documentation provided to the Standing Committee on Economic Development at this time.

References to, and within, this transcript can be found on the Nova Scotia Government Web Site at: http://www.gov.ns.ca/legislature/hansard/comm/ed/ed_2004nov09.htm

ATLANTIC PROVINCES TRUCKING ASSOCIATION

December 7, 2004

WITNESSES

Atlantic Provinces Trucking Association
Mr. Ralph Boyd – President

Eassons Transport Ltd.
Mr. Dave Miller – Manager of Personnel and Safety

PRESENTATION

The trucking industry in Atlantic Canada is roughly 6 per cent of the national industry. In Nova Scotia, there are 1,100 companies operating within the province.

The Canadian Trucking Alliance is a federation of 4,500 carrier companies within Canada; approximately 400 companies within Atlantic Canada are members. Although the CTA does not represent everybody in the trucking industry, it does have representatives within their association from almost every sector of trucking.

The industry serves every community that is accessible by road. Its revenues have topped the $52 billion mark and members of the Alliance are primarily Canadian-owned. As the consumers' choice of transportation, they deliver 90 per cent of all consumer goods and foods stuffs. They are the just-in-time delivery system in Canada. They add value to the manufacturing sector and are the door-to-door consumers' choice of delivery. Delivering smaller shipments is very suitable to their industry, rather than other modes of transportation, and they are often compared to the rail industry.

Over 400,000 jobs in Canada are directly related to the industry. There are about 263,000 males who have declared their profession as truck driver. In Canada the workforce is made up of approximately 283,000 drivers. There are about 20,000 females who work within the industry and this area of employment is increasing more and more. Direct and indirect workers account for over 700,000 Canadians within the industry.

United States Trade / Border Crossings

A third of Canada's GDP is dependent upon trade with the United States. Trucks carry two-thirds of Canada-United States trade. Over 13 million trucks cross the boarder each year, which equates with one truck every 2.5 seconds; 25,000 trucks per day cross into the United States from Canada and 68 per cent of those trucks involved in international trade are Canadian.

Border security versus trade facilitation

Since 9/11 the industry has changed dramatically. Every time a truck appears at a border, it is now being scrutinized, not only for the content of the goods, but the carrier is put under a microscope, as well as the driver or operator of that truck.

Highway and Environmental Safety

Safety is paramount within the industry. Truck drivers are involved in less than 2 per cent of all vehicle collisions on the highways. Eighty per cent of the time when there is a commercial vehicle involved in an incident, the driver is found to be operating the vehicle in a safe, responsible manner. Fatal collisions are down 12 per cent in the last decade and continue to be reduced.

The general public is constantly looking for a cleaner environment. There is a great deal of pressure upon the industry to operate cleaner. From an environmental standpoint the industry is very regulated, probably more regulated than the other modes of transportation. The industry has now reduced its smog emissions by 40 per cent and by 2006 will have cut emissions by over 90 per cent. As well, sulphur content in diesel fuel cut to 15 parts-per-million from 500 parts-per-million. Also, in 2006 the industry will move to an environment of ultra-low sulphur diesel fuel.

Fuel Tax / Tax Competitiveness

The average tractor-trailer operating on the highways today pays more than $45,000 annually to various levels of government in tax. What the industry contributes to the federal government in fuel taxes alone is over $2 billion a year, and that is only the 4 per-cent excise tax.

It is extremely important that the industry remain very competitive with their American counterparts. Sixty-eight per cent of trucks involved in international trade are Canadian trucks, and they need to be on a level playing field with U.S. competitors. All levels of taxation that are directed to the industry need to be considered and assurances given that the industry will not subjected to additional taxation to the point where they cannot be competitive and serve their customers.

National Highway Program

Another major issue in this country is that in comparison to other industrialized nations Canada does not have a national highway program. Nova Scotia seems to enjoy the only toll highway in North America where there is not a safe, alternate route for truck traffic at no charge. All goods traveling into or out of this province are subjected to a toll. If Nova Scotia moves to a national highway program there has to be better utilization of current infrastructure. It is hoped that the federal government would assist in paying for the highway and the elimination of the toll would enable all users to the benefit of a toll free national highway system.

Since the industry is suffering a labour shortage, better utilization of the highway system may help the industry in its driver shortage situation. As well, long configured vehicles or LCVs being hauled across the four-lane highway system will enhance the industry's ability to be productive and be more cost effective in the services that they provide to their customers.

Skills and Labour Shortage

Currently the industry is at a point where labour shortage is impacting their industry and its ability to move commodities. It will be further impacted as their workforce gets older. The industry is finding that younger people do not want to come into the industry. There is an abundance of good freight, customers are reasonable, and equipment is available. However, it appears that the current focus of the education system is toward the academic rather tahtn the occupational stream. A crisis will be inevitable if there are not sufficient trades people trained and available.

The industry has entered into some cost-sharing arrangements with some students, with forgivable loans, on the condition that they stay in the province for a year. There is a policy within some companies that any family relative of any of their employees will have half of the cost of their tuition paid as a forgivable loan under this cost-sharing arrangement.

MATTERS OF DISCUSSION

Although there were a number of issues discussed throughout the meeting, outlined below are a few of the key issues.

— Labour Shortages.

— Nominee Program.

— Commercial Insurance.

— Infrastructure.

— National Highway Program.

— Border Crossing.

— Fuel Costs and Other Expenses.

— Insurance Regulations.

MOTIONS/RECOMMENDATIONS

As a result of discussions with the Atlantic Provinces Trucking Association regarding age restrictions on insurance for young drivers, the Standing Committee on Economic Development has unanimously passed the following motion:

> "Whereas there is a shortage of eligible truck drivers, the Standing Committee on Economic Development requests that the Insurance Bureau of Canada ensure that eligible licensed truck drivers 25 years and younger be treated fairly and equitable regarding insurance coverage".

DOCUMENTATION

There was no documentation requested by the Standing Committee on Economic Development at this time.

References to, and within, this transcript can be found on the Nova Scotia Government Web Site at: http://www.gov.ns.ca/legislature/hansard/comm/ed/ed_2004dec07.htm

WESTERN VALLEY DEVELOPMENT AGENCY

February 8, 2005

WITNESSES

Western Valley Development Agency
Ms. Janet Larkman – Executive Director

PRESENTATION

The Western Valley Development Agency (WVDA) represents the regional development authority for Annapolis and Digby Counties, which comprises seven municipal units within that region. The regional development authorities are funded by a three-way partnership between the Municipal, provincial and federal governments. This three-way equal funding structure is unique in Canada and is considered to be the best model for community-driven economic development.

Mandate

WVDA's mandate is to act as a catalyst to promote economic development in the region. It is a community-driven organization and they consult with the communities on a regular basis, developing plans and strategies around what they hear from the communities.

The agency has been in business for more than 10 years. Its areas of focus include economic diversification, business retention and expansion, business attraction, innovation and technology, value added manufacturing and opportunities to get the most out of our natural resources, culture and the arts, creativity; the agency has also focused on international collaborations and lifelong learning.

Challenges and Opportunities

Rural communities are absolutely vital to the economy of Nova Scotia. In 1994, there were communities within their region that faced unemployment of as high as 58 per cent. Today, they have a much more diversified economy, stronger economy and the general sense of optimism about the future and their businesses. On average 98 per cent of businesses in the region intend to stay in the community and expand their businesses.

In the last three years the area has seen a net increase of 2,500 jobs. The unemployment rate is averaging about 9.7 per cent and their participation rate in the labour force has increased by 6.6 per cent. Family incomes in the last five years have increased by 12 per cent, and 81 per cent of residents own their own home. That is 10 per cent higher than the provincial average and 15 per cent higher than the national average.

Rural communities have seen a population decline, but the WVDA is hoping that it is possible to reverse the trend. In the 1991 and 1996 census period, the population declined by 4.8 per cent. Between 1996 and 2001 the population decrease was 3.3 per cent. It is hoped that in the next census there will be a leveling off in this area. As well, WVDA is expressing a lot of attention on immigration, business attraction and is focusing on youth leadership and opportunities to bring youth back to their community.

Another key component is the area's broadband infrastructure. In the last year the construction of a community-owned fibre optic network was completed. WVDA feels this will put their rural community at a competitive advantage for attracting businesses and also attracting residents who want to be able to communicate internationally.

The fishery continues to be important. The value of fish landing last year was $69 million, an increase of 32 per cent since 1996. There was also a significant increase in the value of farm gate. While there has been a decrease in the number of farms, the actual revenues coming in the farm gate have increased by more than 76 per cent since 1996. Within Cornwallis Park, itself, the number of full-time equivalent jobs is roughly 1, 300. That is more than double the number of jobs that were there when it was a military base. Cornwallis Business Park is considered to be one of the most successful base conversion projects in Canada.

The Annapolis Valley Campus and the Centre of Geographic Sciences has become the first community college in Nova Scotia to establish an applied research facility within their institution. The Applied Geomatics Research Group, has secured close to $20 million in research grants in the last five years and now employ more than 25 full-time research scientists.

WVDA is now working towards building some sort of business incubation center that would look at commercialization of the research coming out of the college and building on the expertise associated with its work.

In 2001, the region was named one of the 12 official Smart Community demonstration projects in the country. That brought with it a $4.5 million federal investment, which was matched dollar for dollar by the community. The variety of projects that the program supported had contributed to the region having one of the highest levels of computer literacy of any rural community in the country.

Elements of Rural Development

Some of the things that WVDA believe are important elements of rural development are one, that communities should be the primary drivers of economic development and two, that natural resources are the backbone of the rural economy. It is absolutely essential that harvesting be sustainable and that the spinoff benefits of natural resources be maximized by focusing on value added. Third, to learn from other jurisdictions around the world, and get a closer look at what other communities are doing.

Energy

Energy is important to economic development. Nova Scotia is dependent on coal to supply 80 per cent of its electricity needs. The province's use of coal is a major pollutant and is one of the reasons why Nova Scotia is one of the largest per capita producers of CO_2 and sulphur oxide emissions in this country. There needs to be development of new technologies and new ways of producing energy that will be focused on renewable resources that will be sustainable and will be primarily driven within the local communities. This will help address some of the problems with blackouts and the challenges of working with a large power grid.

MATTERS OF DISCUSSION

Although there were a number of issues discussed throughout the meeting, outlined below are a few of the key issues.

— RDA Associations.

— Immigration.

— Fibre Optic Broadband.

— Alternative Energy Sources.

— Natural Resources.

— Fishery.

— Digby Wharf.

— Funding.

— Employment Levels.

MOTIONS/RECOMMENDATIONS

During discussions regarding the divestiture of the Digby Wharf, the Standing Committee on Economic Development unanimously passed the following motion:

> "The Standing Committee would like to urge the federal government to expedite the change in ownership of the wharf from the present company, Maritime Harbours Society, in the interest of the Digby community, along with the necessary funds to ensure the wharf is safe and structurally sound."

In response to the committee's motion the Minister of Transport wrote:

> " The Maritime Harbours Society is currently the lawful owner of the Digby wharf. As such, Transport Canada has no jurisdiction to repair the wharf or to change the ownership arrangement. In accordance with the transfer agreement, MHS cannot sell the port property within ten years after the date of transfer unless the Minister of Transport consents to the transaction. To date there has not been a request from MHS to sell the port to a specific party. Should MHS make such a request, the details would be thoroughly examined before any decision is made about the disposition of the port. Transport Canada has no funding available for any new owner of the wharf."

DOCUMENTATION

There was no documentation provided to the Standing Committee on Economic Development at this time.

References to, and within, this transcript can be found on the Nova Scotia Government Web Site at: http://www.gov.ns.ca/legislature/hansard/comm/ed/ed_2005feb08.htm

NOVA SCOTIA POWER INC.

February 10, 2005

WITNESSES

Nova Scotia Power Inc.
Ms. Nancy Tower – General Manager, Customer Operations
Mr. Alan Richardson – General Manager, Marketing and Sales

In Attendance:
Mr. Peter Doig – Director, Government Relations
Ms. Margaret Murphy – Manager, Public Affairs

PRESENTATION

In 2005, the URB ordered a review and response from Nova Scotia Power Inc. in regard to the November 2004 storm. The board has also retained a number of consultants who are examining NSPI's system, practices and storm response. As part of the review, NSPI filed a report on the storm on January 18, 2005 and in that report they have tried to provide a factual foundation for the November outages. Out of respect for that review process and the work of the consultants, NSPI have avoided drawing conclusions, but they will try to clarify some issues in this regard though there are some issues that will need to await the outcome of the work being done by the consultants.

On November 13 and 14 there was no evidence of a storm, yet many Nova Scotians were without electricity. Others have had frustrating encounters with NSPI telephone technology during the storm. As quoted by Environment Canada, "the heavy snow was especially wet and sticky, with probably twice the adhesion of the snow from White Juan" . . . "Adding in rain, light freezing drizzle and ice pellets, along with close air and dew-point temperatures, created weighty snow accretion on wires and towers of 10 to 15 cm thickness" . . . "Push those thick sheaths of snow with strong gusty winds at 75 km/h and you get an enormous stress load on trees, power lines and transmission towers." NSPI estimated that the ice loading reached up to six pounds per linear foot.

In the November storm, seven steel transmission towers crumpled and 10 wooden structures collapsed. An additional four steel structures and 12 wooden structures were damaged. For context, NSPI maintains a system of approximately 40,000 transmission structures and 550,000 distribution poles. In all 26 towers collapsed out of a total transmission system of 40,000 structures.

The November storm was severe. It caused more physical damage to the transmission system than Hurricane Juan. By contrast, the major storms that struck on January 16 and 17 and then again on January 23 and 24 had very high winds, lots of snow and it resulted in no damage to the infrastructure and no significant power interruptions.

Nova Scotia Power Inc. Response

NSPI's Emergency Services Restoration Plan had been updated and refined since Hurricane Juan, including improvements recommended by the consultant hired by the URB to review NSPI's response to Juan. Based on their plan, the following priorities were implemented: emergency and public safety situations, and critical infrastructure, i.e. hospitals, telecommunications infrastructure, sewage treatment plants, emergency responders. Following this, the next priority is individual customers.

Challenges

As a result of this planning, NSPI had more workers available sooner than they had for Hurricane Juan, and because the storm stalled over Nova Scotia, NSPI were unable to get helicopters in the air to analyze the damage as quickly as they would have liked. Accurately assessing the damage is essential to providing customers with timely information on restorations times.

Secondly, the telephone technology did not perform as expected. Usually, when a customer phones the outage line, the telephone system recognizes the neighbourhood or community from where the call is being made. The customer then receives a message that the power "is expected to be restored" by a specific time. This automated message is delivered in 30 seconds. Callers who want or need more information, can stay on the line to talk to a representative to report an emergency or some other matter or use the automated system to report an outage.

Third, in the case of the November storm, NSPI's system failed. First, Aliant had capped the number of calls that could be received by NSPI. That meant that thousands of customers who otherwise would have heard the call center message did not hear it. The cap on the number of calls has now been corrected. Second, there were problems with the software in the telephone messaging system. Many callers received information that was intended for customers living elsewhere. There was something wrong with the software that caused the geography to be incorrect and delivered messages to customers for the wrong area. This problem was soon corrected on that same day.

NSPI Electrical System Infrastructure

Nova Scotia Power is part of the North American Electric Reliability Council and within that organization a member of the Northeast Power Coordinating Council or NPCC. NPCC is made up of all utilities in northeastern North America, Ontario Hydro, Quebec Hydro, utilities in New York and the New England States. Because NSPI is interconnected to utilities throughout the NPCC region and therefore throughout North America, they must design and build and operate their system according to NPCC Basic Criteria for Design and Operation of Interconnected Power Systems.

NSPI transmission and distribution assets are designed and built to meet or exceed the requirements of the Canadian Standards Association. They also follow a third set of design criteria that is consistent across the industry and is considered good utility practice.

In response to the November storm, NSPI engaged world-renown consultants in transmission line construction and failure analysis. The consultants' preliminary conclusions suggest that the downed structures met CSA design criteria and that they were brought down when the snow and ice loads exceeded that design criteria. This outlined the need to improve communications with customers

MATTERS OF DISCUSSION

Although there were a number of issues discussed throughout the meeting, outlined below are a few of the key issues.

— Linemen / Personnel.

— Line Inspections.

— Claims Process.

— Private Line Crews.

— Infrastructure.

— Maintenance and Inspection Practices.

— Salaries.

— Emergency Services Restoration Plan.

— Relationship with EMO

MOTIONS/RECOMMENDATIONS

There were no motions or recommendations made by the Standing Committee on Economic Development at this time.

DOCUMENTATION

The Standing Committee on Economic Development requested the following information and documentation:

- Confirmation of the number of linemen employed by Nova Scotia Power between 1992 and 2004 with additional breakdown by region,
- A copy of NSPI's policy regarding customer claims,
- Information on whether Nova Scotia Power required by any force of law, whether it's a Utility and Review Board ruling, FERC in the United States, or the result of the ruling of any other utility board in any other province that makes membership in the Northeast Power Coordinating Council mandatory,
- The amounts spent on infrastructure spending over the past 10 years,
- A copy of Liberty Consulting Group report, "Report on Nova Scotia Power Company's Transmission System and Outages Communications",
- A copy of Power System Outage Response, "Report to the Nova Scotia Utility and Review Board – Review of Nova Scotia Power, Inc. Response – Winter Storm – November 13/14, 2004".

References to, and within, this transcript can be found on the Nova Scotia Government Web Site at: http://www.gov.ns.ca/legislature/hansard/comm/ed/ed_2005feb10.htm

OFFSHORE ACCORD

March 8, 2005

WITNESSES

Department of Energy
Ms. Alison Scott – Deputy Minister
Mr. Chris Spencer – Manager of Royalties
Mr. Bruce Cameron – Director of Energy Strategy Implementation
Mr. Sandy MacMullin – Director of Resources Assessment and Royalties

Department of Finance
Mr. Dan Troke – Director of Taxation and Fiscal Policy

Department of Justice
Mr. Jim Isnor – Solicitor, Legal Services Division

PRESENTATION

The offshore accord deal allows Nova Scotia to keep 100 per cent of its offshore revenues for 16 years and it includes a prepayment of $830 million for the first eight years. The deal will also allow the province pay $830 million directly on the $12.5 billion debt, resulting in annual interest savings of about $50 million. The savings will be reinvested into education, health care, infrastructure and other services to benefit all Nova Scotians.

The province has a commitment from the federal government to a legislative review of the agreement in 2020. It is a good deal for Nova Scotia and a good deal for Canadians. It is a deal that will help Nova Scotia move forward towards financial self-sufficiency.

As quoted from Volume 2 of the Strategy, "Over time, the new Department of Energy will work with the Department of Finance to identify specific government initiatives that are of an enduring nature and can be undertaken with offshore revenues . . .". " . . . adding to the provincial budget surplus to enable permanent reduction in provincial debt and annual interest payments, thus improving government's ability to fund programs."

It is believed that if using the cash to make the $830 debt payment and $50 million freed up annually to reinvest in services is a benefit to all Nova Scotians.

Through the Atlantic Energy Roundtable the Department of Energy have been involved in many discussions with OTANS and others about how it foster offshore exploration and development. In a recent Ocean Resources article, OTANS said that the barriers to exploration offshore should be geologic, not man-made.

Barriers to Exploration Offshore

One of the barriers Nova Scotia faces is competition from other regions. Operators will go first to where they believe the return on investment is the highest. Deep water drilling is expensive and can cost up to $100 million to drill a deepwater well off Nova Scotia. This is a lot higher than the cost in competing jurisdictions like the North Sea, the Gulf of Mexico, in Africa or in the Persian Gulf and because these jurisdictions have had more exploration, their success rate is also higher.

Nova Scotia has 900 kilometres of offshore; most of it is not yet explored. With the current world energy demand operators will eventually turn to harder to reach. To encourage them to do this sooner rather than later efforts must be focused on improving competitiveness.

Regulatory Inefficiency

Two most commonly cited barriers for exploration affecting the competitiveness in Nova Scotia and in Atlantic Canada are regulatory inefficiency and complex geology. Regulatory efficiency operators want a predictable and competitive business environment, one in which they can reasonable anticipate costs and approval times. These reforms mean that a developer would need to complete only one set of documents to begin the development permitting process and that all reviews would happen at the same time, rather than one after another, as was the previous case.

It is hoped that this will meet industry's expectations and concerns about the time and length of the approval process and put Nova Scotia in a competitive position with other jurisdictions.

Seismic Testing

During the last round table, the government released a new seismic code of practice to help standardize the process for seismic approval in mitigation across Canada. It is believed that this will assist operators and other stakeholders to understand the issues that have to be considered in any seismic process and provide operators with greater certainty when they make decisions to explore thus allowing the general public a better understanding of what to expect.

The round table also indicated that regulations should stress performance and results and not just paper and process. Government is now in the process of systematically reviewing its outstanding legislation and regulations to ensure that it meets more modern technological standards and worldwide best practices for the offshore sector.

Complex Geology

Nova Scotia's offshore is a very young and emerging area on the world energy market. It has over 900 kilometres of offshore, most of it not yet explored. The geology in the offshore cannot be changed, but there are things that can be done to improve the understanding of that complex geology. One, invest more in research and development particularly in geological studies that will analyze existing data. Two, to develop easy to access resources so geologists and decision makers can have all seismic and geological data that exists in the public domain. These new tools will be integrated into the marketing plans as continued efforts to seek out new opportunities progress.

There are still 33 active exploration licenses in the offshore with a commitment of $1.15 billion in work commitments from the operators. The CNSOPB projects that there will be three seismic programs this year and two to three exploratory wells drilled in Nova Scotia's offshore, those being, EnCana's Marauder, Canadian Superior and BEPCo.

The Department of Energy has a broad mandate and many diverse areas of business. Improving the climate for offshore/onshore exploration and development is one of the two priorities for the department. The more they succeed in the offshore, the more royalty revenues they are able to encourage.

MATTERS OF DISCUSSION

Although there were a number of issues discussed throughout the meeting, outlined below are a few of the key issues.

— Revenue Agreement.

— Abandonments of Drilling Rights.

— Breakdown of Agreement Dollars.

— Drilling/Exploration Challenges.

— Accountability of Funds.

— Decentralization.

— Seismic Testing Data.

— Site Abandonment.

MOTIONS/RECOMMENDATIONS

There were no motions or recommendations made by the Standing Committee on Economic Development at this time.

DOCUMENTATION

There was no information or documentation or information requested by the Standing Committee on Economic Development at this time.

References to, and within, this transcript can be found on the Nova Scotia Government Web Site at: http://www.gov.ns.ca/legislature/hansard/comm/ed/ed_2005mar08.htm

OFFSHORE ACCORD

March 22, 2005

WITNESSES

Offshore/Onshore Technologies Association of Nova Scotia
Mr. Paul McEachern – Managing Director
Mr. Tom Hickey – Chairman of the Board
Mr. Barry Clouter – Vice-Chairman
Mr. Richie Mann – Member at Large
Mr. Neal Dawe – Policy and Communications

PRESENTATION

The Offshore/Onshore Technologies Association of Nova Scotia (OTANS) represents about 450 companies on the supply and service side of the oil and gas industry. The industry employs approximately 2,000 people; and brings millions of dollars in royalties and possibly a lot more now that the offshore agreement has been concluded with the federal government, as well as taxes and payrolls to the province.

The accomplishments of the Atlantic Energy Roundtable have been significant. The recent Offshore Royalties Agreement between the Nova Scotia Government and the Government of Canada are vitally important to this industry and to the province. Receiving 100 per cent of offshore royalties will have a positive financial impact on Nova Scotians. In the past, industry detractors have consistently claimed that the province did not receive enough benefits from the industry, but now Nova Scotians will see it as a benefit for more money for education, health care and other service.

Growth and Development

Nova Scotia has a viable industry but it will only grow with exploration and development. In the short term, development would mean contracts and jobs for many local firms and the people that they employ. Making the local supply and service community globally competitive will, in return, increase the appeal of the region to international operators for continued investment.

The offshore is a cyclical industry where exploration will not always be regular or predictable. Best estimates are that exploration will be in the level of two to five exploration wells per year for the next two to three years. The cost of operating in this region is relatively high. Costs associated with harsh weather conditions, regulatory concerns, taxation rates and other matters all impact on the economies of an exploration project. Major operators will always take a long-term global view of their exploration investments and until the region is more competitive with others around the world, operators are not likely to increase their investment here.

Moreover, the availability of drilling rigs has become a real problem. There is only a certain number of drilling rigs which are able to operate in the Eastern Canadian offshore because of the weather conditions and since operators have limited assets, they will be deployed in areas where operators can make the fastest return on their investment. Frontier areas such as Nova Scotia are less likely to be seen as priorities when oil is $50 a barrel and can be extracted in other jurisdictions around the world on a shorter time line.

Exploration will continue to ebb and flow, however, if Nova Scotia has a major new discovery the psychological impact would be significant on the international operators. Nova Scotia's offshore is very lightly explored. There have been less than 200 wells drilled compared to 50,000 wells in places such as the Gulf of Mexico and the North Sea. The challenge becomes how to increase exploration to prove some of the potential.

To ensure that exploration and development continues off Nova Scotia, there are steps that need to be taken to improve the current regulatory structure. These steps are essential in laying the foundation for future success. Governments, local businesses and operators must all be prepared when the next discovery is made and the next project is developed.

- One is reducing the cost of drilling a well. Exploration in Atlantic Canada can cost up to $30 million Canadian, more than in competing regions around the world,

- Regulatory boards must start to consider the cost impacts of regulation and the capital constraints of operators to move quickly to performance or goal-based regulations that could lead to cost reductions and encourage exploration,

- Another thing that needs consideration is a federal act called the Coasting Trade Act, which is being used or could be used to create a monopoly for Canadian-flagged rigs. Offshore drilling rigs are global assets and cannot be considered in the same was as other ships and vessels. There is a recommendation from OTANS to have the CTA changed so that rigs would be exempt.

Seismic Testing

There is progress being made on seismic testing. OTANS has advocated for streamlining of seismic regulations and was pleased to see that Fisheries and Oceans Canada has recognized the importance of maintaining the role of the Canada-Nova Scotia Offshore Petroleum Board as the single window regulator on offshore matters.

Current Development Projects

The environmental assessments of BEPCo's, (Bass Exploration and Production of Canada) proposed multi-well exploration program have determined that there is little risk of negative environmental impacts. As well, two major LNG facilities are on the horizon for the province — Anadarko's Bear Head and Keltic Petrochemical. Those projects will mean millions of dollars, and hundreds of jobs in construction and manufacturing, as well as creating full-time employment when the facilities are operational

Following the agreement on offshore revenue sharing, Nova Scotians now have a real direct stake in the future of the offshore, as its revenues will be a key source of funding for a variety of government services. Developing those resources and collecting the associated revenues will require that emphasis be placed on the offshore. There are several projects such as a digital basin atlas that would add significant value to the prosperity of the region. Creating an accurate exhaustive digital basin atlas would be an invaluable tool for exploration attraction. Moreover, it would give the Department of Energy the ability to study those findings and learn more about how the offshore geology is structured and how hydrocarbon plays may be found.

In order to ensure that Nova Scotia receives the best possible development arrangement with operators it may also be necessary to bring in negotiators with expertise and experience in the industry to deal directly with operators on the province's behalf. There can be no substitute for having experienced, respected negotiators representing Nova Scotia's interests at the table.

MATTERS OF DISCUSSION

Although there were a number of issues discussed throughout the meeting, outlined below are a few of the key issues.

— Onshore Projects.

— Educational Training.

— Seismic Testing.

— Digital Atlas Basin.

— Significant Explorations.

— Seaboard Clutter.

— Sole-Sourcing.

MOTIONS/RECOMMENDATIONS

There were no motions or recommendations made by the Standing Committee on Economic Development at this time.

DOCUMENTATION

The Standing Committee on Economic Development requested the following documentation:

- A copy of a presentation based on a global scenario regarding the amount of crude extracted from the ground and what amount of crude remain in the ground.

References to, and within, this transcript can be found on the Nova Scotia Government Web Site at: http://www.gov.ns.ca/legislature/hansard/comm/ed/ed_2005mar22.htm

ACTRA/DIRECTORS GUILD OF CANADA

April 5, 2005

WITNESSES

ACTRA
Mr. Gary Vermeir – Branch Representative
Mr. Nigel Bennett – President, ACTRA Maritimes Branch Council

Directors Guild of Canada
Mr. Jarrod Baboushkin – Business Agent

PRESENTATION

Both ACTRA and the Directors Guild of Canada are grateful for the recent provincial announcement regarding the increase in the tax credit levels. Previously, the tax credit level for film and television production as 30 per cent; now it has been increased to 35 per cent, with a 5 per cent regional bonus and a 5 per cent frequent filming bonus, which means that the maximum amount of the tax credit in Nova Scotia is 45 per cent.

ACTRA's position had always been that the base level should be raised to 40 per cent to maintain competitiveness with the rest of Canada. When there was a 30 per cent base tax rate, Nova Scotia was at the bottom of the table in terms of levels of tax credits in Canada.

British Columbia, Ontario and Quebec, who have significantly lower levels, have the major infrastructure, which Nova Scotia does not meaning that whenever a film has to be process, it has to be sent out of the province. All films shot here, all of people who have to be flown in and accommodated adds up to extra costs for the film producers. Producers say that it costs them in the end just about exactly the same amount to film here as it does in Ontario because Nova Scotia does not have infrastructure. A lot of that expertise that is flown in by producers really does not need to be because the talent is here.

Competition

As soon as Nova Scotia announced that its tax credit level was going to increase other provinces, in particular, provinces that are in direct competition with Nova Scotia, announced that their tax levels were going to increase. For example, Manitoba announced that it was increasing its tax credit to 45 per cent as a base rate, plus the 5 per cent for regional production, plus 5 per cent for frequent filming. This puts the maximum tax credit for Nova Scotia at 45 per cent whereas the maximum for Manitoba is 55 per cent. This is a great difference, and it makes a real difference to film producers' decisions about where they are going to film.

Alberta makes direct grants to producers rather than offer tax credits. Saskatchewan does neither. The nice thing about a tax credit is hiring provincial labour. Manitoba is about the same size as Nova Scotia and they are attracting the same type of production, they also do not have the sound stages. It is an economy of scale that the size of the production community, the cost of shooting in terms of permits and other things just becomes a matter of who can offer the sweetest deal.

New Brunswick has had a 40 per cent tax credit for years and they have not had a large amount in production and to a large extent that is because they do not have the infrastructure, they do not have the concentrated crew that Nova Scotia has. Nova Scotia has the capacity, the personnel and the track records. It just needs to make sure that it can offer incentives equal to its competitors.

ACTRA and DGC would like to recommend that the level of the tax base be increased from 35 per cent to 40 per cent. In the Premier's announcement, there was a 10-year commitment to the idea of a tax credit for film and television production to keep Nova Scotia competitive with the rest of the country. Unless there is a further increase in the tax credit, Nova Scotia will not be competitive.

Reasons why producers come to Nova Scotia to film is that the province has very good reputation in terms of past productions. The crews are highly skilled, the talent pool is very good and growing. This extra 5 per cent is needed to encourage producers to come here and to maintain the provinces competitiveness.

Without the higher tax credit, the industry would not be in as competitive a position as if they did. The industry is a very mobile, producers make decision very quickly and essentially, on financial considerations. As the global industry becomes more competitive, there are more choices in where to locate productions and producers can automatically eliminate those that do not fall within the competition criteria needed to make their project viable.

Long Term Commitments

Nova Scotia should also be looking at the long-term future of the film industry. Film productions that should be considered for tax credit assistance are commercials. Currently, only film and television is covered, commercials are not. This should be expanded as approximately 25 per cent of the overall income of ACTRA members is from commercials. Another area is digital technology. More films and television are using special effects. There is educational DVD creation; there is a computer-generated imagery, blue-and-green screen filming. All of these areas, as well as animation, should be considered for extra tax credits.

Another area where the province could do more, in terms of both its visible and actual commitment to the film industry, is on occasions when the province itself becomes a producer of audiovisual material. The industry is still seeing a number of government organizations that are not adhering to industry standards, in terms of hiring crews and performers for government audio-visual material. Commercials being done for the Atlantic Lottery Corporation, and the Nova Scotia Liquor Corporation are being done without the benefit of union contracts, without using professional performers or professional/unionized crew. This sends a strong message to the people within the organizations, who are dedicated to building this industry. The industry would like to see the Government of Nova Scotia become signatories to their collective agreements.

The film industry is a strong and vibrant, however, it will continue to be challenged to attain its full potential as long as other jurisdictions offer more competitive incentives to both domestic and foreign producers.

The industry encourages the Nova Scotia Government to work with the relevant labour and industry organizations in order to come to an agreement that will allow talented Nova Scotia crews and performers to work on government productions.

MATTERS OF DISCUSSION

Although there were a number of issues discussed throughout the meeting, outlined below are a few of the key issues.

— Employment.

— Competition.

— Base Tax Rate.

— Federal Tax Credit.

— Nova Scotia Benefits.

— Infrastructure.

— Education/Training.

MOTIONS/RECOMMENDATIONS

Following discussion regarding the film tax credit and provincially made productions, the Standing Committee on Economic Development unanimous passed the following motion:

> "The Standing Committee on Economic Development supports the Nova Scotia Film Industry's effort in requesting a five per cent increase in the film base tax credit and that the government give full consideration to this issue" — and —
>
> "That the Standing Committee on Economic Development write to the appropriate ministers, drawing their attention to the fact that some film and television productions produced by the government are not all made in Nova Scotia and that some government agencies are not using professional actors and unionized crews in audiovisual productions made within the province. The committee also asks that government departments review this matter and ensure that all of these productions are made with Nova Scotia talent and that this matter should extend to any Atlantic province trying to use its influence with any of the Atlantic Provinces Inter-Provincial Agencies, such as the Atlantic Lottery Corporation."

In response to the above motions, the departments stated:

> "The budget currently under review in the House of Assembly includes significant enhancements to the film tax credit . . . these enhancements have place Nova Scotia's tax credit as the second highest in the country and put the province in a very competitive position."
>
> "Also included is a further 'frequent film bonus' of five percent for companies that film more than two projects within a two-year period and an additional $600,000 to the Nova Scotia Film Development Corporation for existing programming in 2005-2006." — and —
>
> " The department strongly support the use of Nova Scotia talent when possible and would encourage provincial agencies to use their best efforts to do this. Requiring provincial agencies to become signatories to union agreements is not something we would mandate as it is our understanding that unionized commercial production shoots are simply not an industry standard."

DOCUMENTATION

There was no documentation requested by the Standing Committee on Economic Development at this time.

References to, and within, this transcript can be found on the Nova Scotia Government Web Site at: http://www.gov.ns.ca/legislature/hansard/comm/ed/ed_2005apr05.htm

NOVA SCOTIA BUSINESS INC./ OFFICE OF ECONOMIC DEVELOPMENT

May 17, 2005

WITNESSES

Nova Scotia Business Inc.
Mr. Stephen Lund – President and CEO
Mr. Pat Ryan – Vice President, Financial Services
Mr. Martin Walker – Director, Small Business Growth
Mr. Peter MacAskill – Director, Corporate Services

Office of Economic Development
Mr. Paul Taylor – CEO
Mr. Chris Bryant – Director, Decision Support
Mr. Marvyn Robar – Director, Development Initiatives
Mr. Neal Conrad – Director, Community and Rural Development

PRESENTATION

NSBI

The provinces' growth during the past few years had been steady and solid. In 2004, 5,400 jobs had been created, an increase of 1.2 per cent meaning that Nova Scotia outperformed several other provinces across Canada in job numbers. However, there is more work to be done to continue to build Nova Scotia's economy even further.

Nova Scotia Business Inc. is part of a group who are all working toward a more prosperous Nova Scotia. Professionals at NSBI's offices throughout the province are also working side by side in the effort. Since NSBI's inception four years ago, their work with companies has secured deals that resulted in the creation of 7,500 jobs and the maintenance of another 3, 500. The distribution of the jobs is roughly shared equally between rural and urban locations. The total payroll impact is estimated at $315 million, and over the past three years the province's net return was $40 million.

NSBI is more than a lending institution. They are a business development organization as well.

NSBI has staff dedicated to growing business through four services:

- Business Advisory Team members in six regions throughout Nova Scotia held more than 700 meetings with Nova Scotia companies in 2004. The advisory team made referrals to NSBI's export and financial services groups and other partner organizations,

- NSBI's Export team helped companies generate more than $30 million and increased export sales during 2004-05. Their export programs missions to various international markets resulted in 171 companies holding more than 500 business-to-business sales meetings,

- In 2004, their Financial Services Team arranged 13 financings with growth-oriented Nova Scotia companies, and their Business Development team attracted 12 companies that had relocated all or part of their business to Nova Scotia during 2004-05.

NSBI staff is focused on finding solutions for business, including NSBI payroll rebates, export and advisory services, loans and other financial solutions. NSBI's mandate and regulations help grow businesses in Nova Scotia and must generate a return on investment for their shareholders – the citizens of Nova Scotia.

Snairs Golden Grain Bakery

In 2004 NSBI staff worked closely with Snair's Bakery for more than four months. The due diligence of the business case ruled out a favourable recommendation despite everyone's dedicated efforts to reach some solution for Snair's. When asked how much money Snair's was looking for, NSBI cited confidentiality of client privileges and protection of privacy.

Office of Economic Development

Small business is an important element of the economy of Nova Scotia. Citing a few statistics, it was said that 92 per cent of employer businesses in Nova Scotia are classified as small business who contribute about half of the province's GDP and create 40 per cent of the net new jobs in the province.

A few of OED programs aimed at small business are:

- The Credit Union Loan Guarantee Program, which is a partnership among the credit unions, the Nova Scotia Co-operative Council and the Nova Scotia Provincial Government. Introduced a few years ago, this partnership has resulted in $8 million in loans given to 115 small businesses and the creation and maintenance of more than 700 jobs mostly in rural areas.

- Nova Scotia's Community Economic Development Investment Funds (CEDIFS) began about five years ago. Since then 26 of these funds have been created with more than $13 million in capital raised, again invested in small enterprises. In 2005, a record for investments was set with more than $32 million raised.

- In 2004 the government announced a five-year extension to the $1.5 million prototype boat credit facility for members of the Nova Scotia Boatbuilders Association. This program gives the members the opportunity to develop new products for export as well as for the fishery and recreational markets. Over the past five years, the boat building industry has introduced 30 prototype products into the market place.

- The supplier development program at OED is working to have more Nova Scotia companies involved in the procurement process. Firms already capture approximately 80 per cent of the $1 billion a year in procurement put out by the province and the MASH sector.

OED are engaged with a number of initiatives; for example, reverse trade shows, a new procurement directory, and an electronic notification system for bidders. The legislation to eliminate the business occupancy tax, the completion of the red tape reduction initiative and the increase in the small business tax threshold, as well as new export and trade initiatives are all helping to improve the climate and prospects for small business in the province. There are many initiatives and programs available for small business and many efforts are underway by government to support and enhance the work of these small businesses.

MATTERS OF DISCUSSION

Although there were a number of issues discussed throughout the meeting, outlined below are a few of the key issues.

— Small Business.

— Rural Population Decline.

— Brand Nova Scotia.

— Community and Rural Development.

— Cape Breton and Area Small Business.

— Out Migration.

— Snairs Golden Grain Bakery.

— Business Size.

— Funding Thresholds.

— Payroll Rebate Program.

— Incentives outside of Metro.

— Credit Union Program.

— Economic Growth Strategy.

— Advisory Council on Innovation.

MOTIONS/RECOMMENDATIONS

There were no motions or recommendations made by the Standing Committee on Economic Development at this time.

DOCUMENTATION

The Standing Committee on Economic Development requested the following information and documentation:

Office of Economic Development,

- Provide to the committee a detailed report of the performance of the Small Business Financing/Loan Guarantee Program,

Nova Scotia Business Inc.,

- Provide statistics regarding the number of projects NSBI has done in the Kings Co. area;
- Provide a breakdown of the number of jobs created and maintained and where these jobs are located,
- Provide a listing of the 700 companies referred to during the meeting and indicate how many employees each company employs.

References to, and within, this transcript can be found on the Nova Scotia Government Web Site at: http://www.gov.ns.ca/legislature/hansard/comm/ed/ed_2005may17.htm

RETAIL GASOLINE DEALERS ASSOCIATION OF NOVA SCOTIA

June 9, 2005

WITNESSES

Retail Gasoline Dealers Association of Nova Scotia
Mr. Graham Conrad – Executive Director
Mr. Roy Pettigrew – Executive Board Member

Independent Dealer
Mr. Neil Cruickshank

PRESENTATION

The oil and gas industry is volatile and unpredictable. Difficult pricing practices by the major oil companies, as well as the domination that they have at the retail levels, is making it absolutely impossible for independent retailers to generate a profit and stay in business.

If remedial action is not taken or if a recommendation is not put forward toward adopting regulations similar to those that exist in Prince Edward Island, then the industry is going to see a serious decline in independent retailers in a short period of time.

As previously recommended, the association would like to see a regulatory system that is modeled after P.E.I. regulations. Within this system Nova Scotia would be divided into zone, there would be transportation differentials established reflecting the cost of delivering product to each of those zones, and there would be recognition that a retail margin exists.

The retail margin would consist of a minimum and a maximum, to allow levels of competition to take place and that would ultimately determine the retail price.

Comparisons between Halifax and Prince Edward Island

Although the product is refined in Nova Scotia and shipped to P.E.I., the difference in prices is within a penny. In P.E.I. the motoring public and retailers have not been subjected to the recent, unpredictable changes in fuel prices.

There have been many changes in Halifax as there has been in Charlottetown so far this year. Retailers on the Island have a system where there is a minimum of 4 cents a litre and a maximum of 5.5 cents on self-serve, and 4 cents minimum on full-serve with a maximum of 6.5 cents. They can adjust their business, develop business plans, forecast what their revenues are going to be based on margins. None of that can be done in Nova Scotia in the independent retail sector. The P.E. I model is view as workable both in the short and the long term.

Bill 79

The Association indicated that they had met with the Premier and the Minister of Service Nova Scotia and Municipal Relations who stated that they have a solution and pointed out that the Government of Nova Scotia was constantly monitoring development in international and local energy markets to determine whether action is required to address market balances. It has also conducted several studies into how best to regulate energy markets should such action become necessary. Thereafter, the Association met with the caucuses and following that there was a commitment from the caucuses to allow Bill 79 to go through. The Association stated they were pleased with the support they received from the opposition parties and how quickly the bill went through the Legislature with unanimous agreement. However, a recent press release stated that the province will now commission an independent study.

Nova Scotia is one of the last provinces in Canada that still has a high proportion of independent retailers who are servicing the industry. This situation does not exist in some provinces because there is virtually no representation of independent retailers in some of the major cities in the country. The Association is concerned because the recent decline in independent retailers is not the normal situation.

MATTERS OF DISCUSSION

Although there were a number of issues discussed throughout the meeting, outlined below are a few of the key issues.

— Loss of Independent Retail Outlets.

— Supply Contracts.

— Big Box Stores.

— British Columbia Independent Retailers.

— Number of Closures.

MOTIONS/RECOMMENDATIONS

There were no motions or recommendations made by the Standing Committee on Economic Development at this time.

DOCUMENTATION

There was no documentation requested by the Standing Committee on Economic Development at this time.

References to, and within, this transcript can be found on the Nova Scotia Government Web Site at: http://www.gov.ns.ca/legislature/hansard/comm/ed/ed_2005jun09.htm

STATEMENT OF SUBMISSION

All of which is respectfully submitted to the House of Assembly
this 24th day of November, 2005

Mr. Michel P. Samson, MLA (Chairman)
(Richmond)

Mr. Brooke Taylor, MLA
(Colchester-Musquodoboit Valley)

Mr. Charlie Parker, MLA
(Pictou West)

Mr. Bill Dooks, MLA
(Eastern Shore)

Ms. Marilyn More, MLA
(Dartmouth South – Portland Valley)

Ms. Judy Streatch, MLA
(Chester St. Margaret's)

Mr. Wayne Gaudet, MLA
(Clare)

Mr. Howard Epstein, MLA
(Halifax Chebucto)

Mr. Harold Theriault, MLA
(Digby-Annapolis)

Committee Membership

During the First Session of the Fifty-Ninth General Assembly of the House of Assembly, the Standing Committee on Economic Development was comprised of the following members:

Mr. Russell MacKinnon, MLA (Chairman)
(Cape Breton West)

Mr. Brooke Taylor, MLA
(Colchester-Musquodoboit Valley)

Mr. Bill Dooks, MLA
(Eastern Shore)

Dr. Mark Parent, MLA
(Kings North

Mr. Howard Epstein, MLA
(Halifax Chebucto)

Mr. Charlie Parker, MLA
(Pictou West)

Mr. David A. Wilson, MLA
(Sackville-Cobequid)

Mr. Wayne Gaudet, MLA
(Clare)

Mr. Harold Theriault, MLA
(Digby-Annapolis)

During the First Session of the Fifty-Ninth General Assembly the following changes were made to the Standing Committee on Economic Development. Mr. Russell MacKinnon, MLA (Cape Breton West) was replaced by Mr. Michel Samson, MLA (Richmond) and Mr. David A. Wilson, MLA (Sackville-Cobequid) was replaced by Ms. Marilyn More, MLA (Dartmouth South – Portland Valley)

Committee Meetings

The Standing Committee has been meeting on Tuesdays since its establishment, and all meetings are open to the public. During the First Session of the Fifty-Ninth General Assembly the Standing Committee on Economic Development has met on the following dates:

October 5, 2004
November 9, 2004
December 7, 2004
February 8, 2005
February 10, 2005
March 8, 2005
March 22, 2005
April 5, 2005
May 17, 2005
June 9, 2005

Notices

Notices of committee meetings are sent to all members of the committee, support staff of the caucus and legislative office, the House of Assembly Press Gallery, the government wire services and is published on the internet.

Transcripts

Transcripts of the committee meetings are available from the Legislative Committees Office, 3rd Floor, Dennis Building, 1740 Granville street, P.O. Box 2630 Station M, Halifax, NS B3J 3N5 or from the provincial government web-site:
www.gov.ns.ca/legislature/COMMITTEES/index.html

Reports

All reports of the Standing Committee on Economic Development are compiled by the Legislative Committees Office and forwarded to the Committee members for consideration. Once the report is finalized it is then distributed as follows:

> To the Speaker/Clerk of the House of Assembly, Members of the Legislative Assembly; all those witnesses who made presentations before the Committee; all Legislative Libraries, including the Territories, and the media. The report is also available to all persons interested in obtaining a copy from the Legislative Committees Office or through the Legislature Web-Site.
> http://www.gov.ns.ca/legislature/COMMITTEES/index.html

Acknowledgements

The Standing Committee on Economic Development wishes to extend its gratitude to the following:

Representatives of the Office of Economic Development; Credit Union Central of Nova Scotia; Nova Scotia Cooperative Council; Nova Scotia Federation of Agriculture; Atlantic Provinces Trucking Association; Eassons Transport Ltd.; Western Valley Development Agency; Nova Scotia Power Inc.; Department of Energy; Department of Finance; Department of Justice; OTANS; ACTRA / DGC; Nova Scotia Business Inc, Retail Gasoline Dealers Association of Nova Scotia and Mr. Neil Cruickshanks (Independent Retailer). Special thanks goes to the following for their time and consideration: the Legislative Committees Office; Mr. Robert Kinsman, Manager of Hansard; Hansard Staff; Mr. James McInnis, Co-ordinator, Legislative Television; Legislative Television Staff; Mr. Michael Laffin, Co-ordinator, House of Assembly Operations; House of Assembly Staff; and to Margaret Murphy, Legislative Librarian and Library Staff.

Appendices

Small Business Loans Program

- A list of venture capital funding.

Nova Scotia Power Inc.

- Confirmation of the number of linemen employed by Nova Scotia Power between 1992 and 2004.
- Nova Scotia Power's policy regarding customer claims.
- Nova Scotia Power's membership within the Northeast Power Coordinating Council.
- The amounts spent on infrastructure spending over the past 10 years.
- "Report on Nova Scotia Power Company's Transmission System and Outages Communications".
- "Report to the Nova Scotia Utility and review Board – Review of Nova Scotia Power, Inc. Response – Winter Storm – November 13/14, 2004".

Offshore/Onshore Technologies Association of Nova Scotia

- A copy of the presentation based on a global scenario regarding the future of the oil and gas industry.

Nova Scotia Business Inc. / Office of Economic Development

- A copy of the report showing the performance of the Small Business Financing/Loan Guarantee Program.
- Statistical numbers regarding NSBI projects in the Kings Co. area.
- A breakdown of the number of jobs created and maintained and where these jobs are located.

SMALL BUSINESS LOANS PROGRAM

	Chart. Banks	BDC	CBDC	BBI	ABC	Uln'wog Dev.	ACOA ECBC	IRAP	NSBI	NSCC	AC IF
0 - 25k	X	X	X	X		X	X			X	
25k - 150k	X	X	X			X	X			X	
150k - 250k	X	X					X		X		
250k - 1mm	X	X					X				X
SBL Max 250K	X										
SBL Cap Lease	X										
Youth		X	X	X			X			X	
Women		X	X	X			X			X	
Aboriginal					X	X				X	
Afro-Canadian				X						X	
Technology		X	X				X	X	X		X
Grants/Contr.					X			X			
Equity Sub-Debt/Venture		X	X	X					X	X	
Working Capital										X	
Lines of Credit										X	

NOVA SCOTIA POWER INC.

NOVA SCOTIA POWER
An Emera Company

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March 8, 2005

Mr. Michel Samson
Chair, Economic Development Committee
3rd Floor, Dennis Building
1740 Granville Street
PO Box 2630 Stn "M"
Halifax, NS B3J 3N5

Dear Mr. Samson:

RE: COMMITTEE MEETING FEBRUARY 10, 2005

Thank you for the chance to meet with the Committee on February 10, 2005. The clerk of the Committee provided us with a copy of the transcript on February 25, 2005. There were several questions asked at the meeting which we agreed to answer in writing, and which are attached to this letter.

I also wanted to take this opportunity to update you on a significant milestone in the Outage Review being conducted by the UARB.

Two independent electricity industry experts hired by the Utility and Review Board to review Nova Scotia Power in the aftermath of last November's storm and outage have filed their reports. The conclusions of Liberty Consulting Group and Power System Outage Response confirm that Nova Scotia's electricity system is sound, and that appropriate design standards, and inspection and maintenance practices are in place to keep it that way. Excerpts from the reports are attached

These reports also confirm that the outages of last November were a result of extreme weather conditions, and not due to any issues of system design, inspection, maintenance or operation.

The consultants have made a number of recommendations, many of which we are already working to implement. These reports will be very useful in continuing to improve service to our customers.

The reports will form part of the record at a public hearing, which will be held in April as part of the outage review. A full copy of the reports the consultants have filed with the Utility and Review Board can be found at the Nova Scotia Power website (www.nspower.ca).

Thank you again for the opportunity to meet with the Committee.

Sincerely,

Nancy G. Tower, FCA
Vice President,
Customer Operations

cc. Mr. Brooke Taylor
Mr. Mark Parent
Mr. Howard Epstein
Mr. David Wilson
Ms. Marilyn More
Mr. Wayne Gaudet
Mr. Harold Theriault
Ms. Darlene Henry

Answers to Committee questions

1. Confirm the number of lineman employed by Nova Scotia Power between 1992 and 2004, with additional breakdown by region. (pp. 7, 9)

Please see Sherrod IR- 13, and CME IR -2 filed in response to the November Outage review Hearing being conducted by the UARB, each of which is attached.

2. Copy of NSPI's policy regarding customer claims (p. 14)

NSPI's practice with respect to claims is similar to others in our industry. Each claim is received and reviewed based on its merits. Claims are paid on the basis of negligence. In circumstances resulting in power outages which are beyond the utility's ability to control, such as storms, floods, vandalism, animals, strikes, fires, accidents external to their operations, claims will not be honored by Nova Scotia Power.

3. Is Nova Scotia Power required by any form of law, whether it's a Utility and Review Board ruling, FERC in the United States, or the result of the ruling of any other utility board in any other provinces that make membership in the Northeast Power Coordinating Council mandatory? (p. 18)

Nova Scotia Power is interconnected to the North American electricity transmission grid. As a consequence of this interconnection, NSPI is required to plan, design and operate its bulk power system in compliance with Criteria, Guides, and Procedures established by the Northeast Power Coordinating Council and applicable NERC/NAERO Standards. NSPI is a member of the Northeast Power Coordinating Council, which in turn is a member of the North American Electricity Reliability Council.

4. Please provide amounts spent on infrastructure spending over the past 10 years

The annual expenditures within Customer Operations (both capital and operating) is provided in the Report filed with the UARB on January 18, 2005, at page 78 (attached).

5. Please provide infrastructure spending for the Annapolis Valley area in the last 5 years, and its comparison with other utilities across Canada?

The scope of the information requested is not clear. We have contacted Mr. Parent directly to obtain clarification of the information sought.

The remaining request was for neighbourhood specific information, which will be directed to the MLA in question as agreed during the meeting.

Excerpts from independent consultant reports

The comprehensive reports follow several weeks of investigation by the experts into Nova Scotia Power's practices and procedures. Among the key findings in the reports:

Liberty Consulting Group Comments

- "... found the overall physical condition of the transmission plant to be very good."
- "NSPI designed its transmission structures ... according to CSA (Canadian Standards Association) ... methods and in conformance to good utility practice. "
- "NSPI's transmission inspection program complies with good North American utility practices, and it appropriately monitors the condition of NSPI's transmission system."
- "NSPI's transmission maintenance practices substantially comply with good North American utility practices and are appropriate for maintaining the condition of the transmission system."
- "Maintenance practices did not contribute to (transmission) structure failures or outages occurring during the November 2004 storm."

Power System Outage Response Comments

- "...found the state of NSPI distribution facilities to be very good - better than the condition of similar facilities at other utilities of which Consultant is knowledgeable."
- "The NSPI distribution inspection processes, both routine (pre-event) and post-event, appear adequate and appropriate to good asset management."
- "The (distribution system) damages resulting from the (November 2004) storm were not a result of any deficiency in NSPI inspection and maintenance processes."
- "The staffing levels of NSPI power line technicians (PLTs) as maintained for the past ten years and available at the time of the subject storm are within customary limits in the industry and did not have a negative impact on maintenance of NSPI distribution facilities or on storm outage response."
- "The NSPI response to the ...storm was effective and utilized an appropriate amount of workers to complete the restoration in an amount of time well within acceptable limits in the industry."

Report on Nova Scotia Power Company's Transmission System and Outage Communications

Presented to:

Nova Scotia
Utility and Review Board

By:

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March 4, 2005

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I. Introduction

A. Background

On November 13 and 14, 2004, Nova Scotia experienced its first winter storm. The storm brought wet, slushy snow, strong gusting wind, and temperature near freezing. Nova Scotia Power Inc. (NSPI or the Company) generates, transmits and distributes most of the electricity in Nova Scotia. As a result of the storm, a significant percentage of NSPI's customers lost electric service, some for up to five days. NSPI attributed the power interruptions to overhead lines sagging or breaking under the snow and ice buildup and the failure of wood and steel structures.

The Nova Scotia Utility and Review Board (the Board) is the provincial regulator of public utilities in Nova Scotia. On December 14, 2004, the Board issued a request for proposals (RFP) for consultants to examine NSPI's communications and its transmission system operations, maintenance, and planning. The Liberty Consulting Group (Liberty) responded to the Board's RFP and, on January 12, 2005, learned that Board selected Liberty for the requested study.

B. Study Objectives

The Board's RFP was specific with regard to tasks the selected consultant was to accomplish. In the area of transmission system operations and maintenance, the consultant was to field inspect and conclude on the adequacy of design criteria and the condition of failed and remaining towers and pole structures in both areas affected by the storm and areas not affected. In addition, this part of the review included an evaluation of NSPI's maintenance and inspection programs, vegetation management, staffing, replacement structure inventory, and lessons learned from prior weather events.

In the area of transmission system planning, the consultant was to discover why the collapse of a relatively small number of transmission structures would affect such a significant number of customers in the Province. The consultant was also to opine on the overall design and reliability of the transmission network, examine constraints to electricity flow in the system, review the system monitoring schemes and fault indication devices, and explain why the collapse of relatively few structures would result in the loss of power to many customers.

In the third area, communications, the consultant was to examine NSPI's call centre and its staffing, its outage management system, the capability to respond to a large number of customers, the methods of outage notification, and lessons learned from prior events.

Liberty organized its review and this report along these same three lines. The following major sections of this report deal with:

- Transmission System Maintenance and Structure Design
- Transmission System Planning and System Design
- Communications and Outage Response.

Appendix One to this report provides the resumes of Liberty's study team members.

C. Transmission System Overview

System Characteristics

NSPI is a member of the Maritime Power Pool (MPP). The MPP is comprised of the electric systems of Nova Scotia, New Brunswick, and Prince Edward Island. The MPP has two limited DC interconnections with Hydro Quebec and one limited AC interconnection with ISO New England, all connected to the New Brunswick system. As such, the MPP is geographically remote from the remainder of the North American power grid. Internal to MPP, limited electrical ties exist between New Brunswick and Prince Edward Island and between New Brunswick and Nova Scotia. Nova Scotia is therefore a predominately stand-alone electric power system.

NSPI's transmission system operates at the voltages and has the lengths of line shown in the table below.[1]

Voltage (kV)	Length (km)
345	468
230	1,253
138	1,786
69	1,668

The system serves approximately 2,250 MW of load and the entire province of Nova Scotia, including six municipal electric companies (40 MW) and interruptible load (350 MW). The region served is rural except for the major load areas of Halifax, Sydney, and Truro.

The transmission system connects electric generating plants with the distribution system load. The major generating stations in NSPI's system are at Lingan, Point Aconi, Point Tupper, Trenton, and Tuft's Cove. All of these stations except Tuft's Cove are north and east of Halifax. Approximately 1,600 MW of generation is located east of Halifax and approximately 700 MW of generation is located either in Halifax or in the western part of the province. Any import from New Brunswick is located north of Halifax. The load served by these stations is not similarly located. Approximately 900 MW of load is located east of Halifax and approximately 1,350 MW of load is located either in Halifax or in the western part of the province. Therefore, the transmission system must serve a system that has load predominately in the western part of the province with generation that is predominately in the eastern part of the province. The generation in the Sydney area is approximately 350 km away from the load in the Halifax area.

A large part of the higher voltage transmission lines, referred to as the "backbone" transmission system, resides between the generation in the Sydney area and the load in the Halifax area. A single 345 kV and two 138 kV lines (which reduce to a single line at Springhill substation) provide a weak electrical link from Nova Scotia to New Brunswick. In order to reliably operate its transmission system, NSPI monitors the flows between Cape Breton and Halifax at various locations and between Nova Scotia and New Brunswick, and maintains those flows within specified ranges. NSPI also employs a variety of Special Protection Systems[2] to maintain reliable

[1] Response to Information Request IR-14.

[2] Typical protection systems isolate faulted equipment of lines. However, Special Protection Systems (SPS) are different because they are used to trip circuit breakers to solve potential stability or thermal problems.

system operation while maximizing its ability to move generation throughout the province. The remainder of the transmission system serves load in a radial fashion, predominately by the 138 kV and 69 kV systems.

Lessons Learned

Prior to the November storm, NSPI has experienced two major weather events that posed a major threat to continuity of electrical service to large portions of the province. Those events were the ice storm in 1997 and Hurricane Juan in 2003. Neither of these previous events were transmission system related as there were no transmission outages during the 1997 ice storm and only one 138 kV circuit was lost during Hurricane Juan.[3] Nevertheless, NSPI performed inspections of all transmission plant in the affected areas and found no damage related to the effects of weather.[4] Therefore, with regard to transmission system design, operations, and maintenance, there were no lessons for NSPI to assess. Liberty discusses lessons learned with regard to outage communications in Section IV of this report.

With regard to lessons learned from the November storm, NSPI's initial belief is that neither system planning nor operations could have been more robust to mitigate the effects of the storm.[5] NSPI also stated that it has not changed the design, operation, or maintenance of the power system components, but is awaiting the completion of an independent mechanical investigation of failed transmission structures, due March 30, 2005.[6] Liberty reviewed an interim report on the failed structures but it was not complete when Liberty prepared this report. Liberty recommends that NSPI make a new assessment of possible lessons learned from the November storm after the conduct of a complete hearing on the issues.

Inspections

Liberty's inspections of NSPI's transmission system included an aerial inspection conducted on February 17-19, 2005. This inspection covered the vast majority of the transmission system including the Antigonish–Sydney area to assess the general condition of the transmission system in the area not affected by the November storm event and most areas where the storm damaged transmission structures. NSPI personnel accompanied Liberty on these aerial inspections.

Liberty found the overall physical condition of the transmission plant to be very good. The scattered, widespread items noted that required repairs and little system damage indicated that an ongoing inspection program is in place and that NSPI is performing required corrective maintenance. Liberty discussed issues that it observed on the inspections with NSPI personnel. These included matters such as gunshot damage in the Lingan and Point Aconi area, broken sky wires, and vegetation clearances, particularly on portions of the 69 kV and 138 kV systems.

[3] Response to Information Request IR-60.
[4] Response to Information Request IR-68.
[5] Response to Information Request IR-60.
[6] Response to Information Request IR-61.

D. Summary of Findings

During the November storm, 26 transmission system structures, both steel and wood, failed. The photographs of twisted and downed transmission structures were both spectacular and unusual. Because of this, it appears that many at least initially believed that the failed structures were the primary cause of the widespread customer service interruptions. However, Liberty's analysis of the storm showed that it was, much like many other severe storms that affect electric service, primarily a distribution system event except for the Annapolis Valley area. There were customer interruptions caused by failures in the transmission system, but these were the minority of the interruptions. Moreover, the interruptions initiated by the failed transmission system structures contributed a small percentage of the overall effects of the storm on NSPI's system.

In the area of communications, Liberty found that NSPI's overall call center performance is average when compared to other electric utilities. However, during the November storm, NSPI experienced significant failures in its Call Center telephony, at least some of which NSPI could have avoided. NSPI's Call Center response to the storm was inadequate, including its ability to quickly ramp up staffing in the center. Liberty recommends that NSPI redesign its call center technology and rigorously test it before use. NSPI also needs to research customer expectations to confirm that the technology it designs will meet customer needs.

Liberty assessed NSPI's design of the failed transmission structures and sky wires and found them in accordance with the appropriate standards. The wind and ice conditions in the November storm created loadings on the structures and sky wires that exceeded design loadings by at least 200 percent. Liberty also found that NSPI's transmission inspection program complies with good utility practices and that transmission maintenance substantially complies with good utility practices. Neither transmission system inspections nor maintenance contributed to the effects of the November storm. Liberty concluded that although tree contact caused some storm transmission outages, NSPI's transmission vegetation management program is substantially consistent with good utility practices. NSPI needs to complete its program to widen and side-cut transmission system right-of-ways.

With regard to other aspects of NSPI's transmission system design, Liberty concluded that:

- System load forecasting is adequate but has internal inconsistencies.
- Planning studies are adequate.
- System design criteria are adequate but could be improved.
- Component rating methods are consistent with good utility practice.

With regard to transmission system operations, Liberty found that:

- NSPI made the correct initial response level prediction according to its ESRP and the available weather information.
- NSPI's system operators acted properly and professionally throughout the November storm.
- NSPI's transmission system has adequate fault location and SCADA installation.

II. Transmission System Maintenance and Structure Design

A. Transmission System Structures

1. Background and Analysis

a. Structures

According to Environment Canada,[7] the November 13-14 storm was special. When it stalled over Nova Scotia, it deposited about 15 cm of weighty snow accumulation on wires and towers, with temperatures hovering around 0 degree C, humidity around 100 percent, and wind gusts to 75 km/h. Out of NSPI's 40,000 transmission structures,[8] 26 collapsed. These were:

- Six 138 kV wood structures on line L6002 near Sackville
- Five double-circuit 138 kV steel structures on line L6003 at Burnside
- Eleven 138 kV wood structures on line L6004 at Sackville
- Two 138 kV steel structures on line L6004 at Panuke Lake
- One 138 kV wood structure on line L6004 at Panuke Lake
- One 138 kV wood structure on L6503.

NSPI reported that it has been active in working with other Canadian utilities in reviewing wind and ice problems. It participates with the CEA[9] Technologies Wind and Ice Storm Mitigation Interest group. One of the interest group's topics is "Assessment of design approaches dealing with climatic loads, particularly of wind and ice."[10]

Liberty reviewed photographs of the collapsed towers, inspected piles of steel and poles from collapsed towers (Burnside and Sackville), visited the sites in Burnside and near Sackville, and analyzed the designs of the five double circuit steel structures[11] at Burnside and the 3-pole wood dead end structure at Sackville. Inspection of the broken poles showed no apparent wood deterioration that was present before the storm. At Burnside, it appeared that the failed middle phase conductor attachment arm of a dead end structure, which did not collapse, at the end of the five collapsed structures had failed first. The failure of this arm was in a longitudinal direction toward the first collapsed tower. The failure of this arm would have created a longitudinal, twisting load on the adjacent towers. Liberty speculates that the failure of this arm, combined with the wind and ice on the adjacent towers, initiated the failure of the five tangent towers. Failures of the dead end towers appeared to have initiated the longitudinal collapsing of the wood structures on the two lines near Sackville.[12] NSPI sent a number of 10-foot examples of

[7] From Environment Canada web site.
[8] Response to Information Request IR-7.
[9] Canadian Electric Association.
[10] Interview with Senior Structures Engineer, January 27, 2005.
[11] 138 kV Double Circuit Type "E" Towers constructed in about 1965.
[12] Liberty inspections on January 28, 2005.

broken sky wires to a laboratory for analysis but test results were not available in time for this report.[13]

The Canadian Standards Association (CSA) standard C22.1 "Overhead Systems"[14] is the appropriate source of transmission structure design wind and ice loads in Canada. CSA standards indicate that utilities should design transmission structures either according to "deterministic loads" or to "reliability-based" loads. However, the reliability-based loading method had not become an optional method until 1998.[15] NSPI has always used the deterministic method.[16] This method requires the designer to select wind and ice loading as medium, heavy, or extreme, based on locality. Nova Scotia is in the heavy loading zone, with maximum one-half inch ice radius on conductors and sky wires[17] and about 8 pounds per square foot of wind (about 88 km/h).[18] Adding to the requirements of the standard, NSPI reported that it added 50 percent more strength in the design of its steel structures for greater transverse wind load and longitudinal tensions and 200 percent more strength in the design of its wood structures for many years. However, the Burnside tower, built in 1965, apparently did not have this added NSPI imposed load factor. NSPI designed the wood structures using the 3.0 load factor. Although the drawing for the 3-pole structure indicated class 3 poles, NSPI indicated that it measured the diameters of the broken poles and found them to be class 2. Class 2 poles have greater diameter and are stronger than class 3 poles. It also reported that it uses class 1 poles are some locations.

A professional transmission structural engineer conducted a structure loading analyses for Liberty on the Burnside 138 kV double circuit towers. He used a structural analysis program and CSA deterministic and worst case reliability-based design and the loadings created by the November 13-14 storm. He based the calculations on conductor and span data provided by NSPI. The storm conditions assumed for that part of the analyses were 7.62 cm of radius wet heavy snow and 64 km/h winds. Even though using reliability-based loading was not in place until 1998, and is currently an optional method, he performed the reliability-based loading analyses to determine whether that method for new construction would have prevented tower collapse.

The results indicated that:

- the Burnside structure design met the CSA deterministic requirements
- during the storm, structure loads were 300 to 500 percent of the deterministic load ratings and 125 to 185 percent of the worst case reliability-based loadings
- the Burnside towers would fail under November 13-14 storm conditions
- even if designed under worst-case reliability-based loads, the towers may have failed.

In a similar analysis of the 3-pole wood structure, he determined that the design met the deterministic load requirements, but would fail under the loads caused by the storm conditions.

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[13] Interview with Manager, Engineering, January 27, 2005.
[14] Response to Information Request IR-45
[15] A similar structural specification has been in use since about 1990.
[16] Interview with Senior Structures Engineer, January 27, 2005.
[17] Sky wires are grounded shield wires above the conductors.
[18] Although not directly comparable with the deterministic method, 1.7 inches of ice and 64 km/h winds would be very conservative (worst case) for design loads using the newer reliability-based method for Nova Scotia.

b. Sky Wires

Sky wires are the grounded conductors installed on the top and either side of NSPI's 345 kV, 230 kV, and 138 kV towers. NSPI also installs sky wires on some of its 69 kV structures near substations. The purpose of these wires is to improve reliability by providing some protection from lightning strikes, to reduce damage caused by lightning, and to minimize three-phase lightning-caused outages.

During the November 13-14 storm, sky wires broke on two 345 kV lines and on five 138 kV lines.[19] An unknown number of sky wires sagged onto conductors. The broken sky wires typically caused permanent sustained outages because they wrapped themselves around the conductors. The sagging sky wires typically caused transient outages or short-time sustained outages that cleared themselves when the ice melted.

NSPI reported that it generally uses 3/8 inch high strength steel sky wires for most installations. However, there are some 5/16 inch and some ACSR.[20] The sky wire on the Burnside steel lattice structures is 134.6-kcmil, 12/7 ACSR. NSPI uses the same control tensions on its sky wires as it uses on its conductors.

Using conductor and sky wire sag analysis software, the structural engineer analyzed the sky wire sags and clearances to conductors using deterministic and storm loads with both 750-foot and 1200-foot spans, ice on the sky wire, and both with and without ice on the conductor. He analyzed all of NSPI's sky wire sizes as well as 7/16 inch steel.

The results of this analysis indicated that:

- the sags and clearances for all NSPI standard sky wires using the standard's deterministic loading conditions would not cause any outages, nor would any sky wires break.
- under storm conditions, 3/8 inch and 5/16 inch sky wires will break; the 7/16 inch steel and 134.6-kcmil, 12/7 ACSR would be stressed, and might break. However, some of these sky wires would likely sag within flashover distance as ice accumulated on the wires before they broke.
- for a 5.72 cm of radial ice load on a 750-foot span, the 3/8 inch steel sky wire would be within one foot of the conductor. For 4.4 cm of radial ice on a 1,200-foot span, the 3/8 inch steel sky wire would be within 1 foot of the conductor. Flashovers would occur before these amounts of ice accumulated.

[19] Appendix 11, NSPI report to Nova Scotia Utility and Review Board, January 18, 2005.
[20] ACSR is aluminum conductor steel reinforced.

2. Conclusions and Recommendations

NSPI designed its transmission structures and sky wires according to CSA deterministic methods and in conformance to good utility practice. Wind and ice conditions in the November storm created loadings on the structures and sky wires that exceeded design by 200 percent.

NSPI's choice to design its transmission structures and sky wires according the CSA deterministic methods was appropriate at the time, and NSPI imposed additional load factors to improve tower strength. Since 1998, it had the option of designing to reliability-based loads. However, it has not constructed any new transmission lines since then. Even if NSPI designed the towers to the new reliability-based method, the structures may have failed.

Despite the appropriateness of NSPI's design, Liberty recommends that NSPI take the actions listed below to potentially improve structure and sky wire strengths.

- In conjunction with other Canadian utilities and Environment Canada, NSPI should determine whether climatic trends in Nova Scotia indicate that NSPI's new transmission structure and sky wire designs, particularly in critical locations, should be reassessed using reliability-based methods.
- Liberty would not consider replacing structures or making major modifications because of a very rare ice storm to be good utility practice. However, NSPI should determine whether it could achieve higher load limits on some critical towers by implementing some minor modifications.
- NSPI should consider upgrading 3/8 inch steel sky wires to 7/16 inch or larger on new designs or on locations where icing may more likely occur on critical lines.

B. Transmission System Inspections

1. Background and Analysis

Good utility practices include a regular and thorough inspection of the transmission system to identify problems and monitor conditions for maintaining safety and reliability. Neither the Northeast Power Coordinating Council (NPCC) nor the CSA[21] have requirements for planned transmission inspection programs. Therefore, it is up to NSPI to determine how to appropriately inspect its transmission system. Liberty has observed that some electric utilities place a low priority on system inspection and reduce or stop them at times to reduce expenditures. NSPI reported that it gives system inspection and maintenance the highest priority in its budgets.[22]

NSPI's planned transmission inspection program includes annual inspection of the entire system, either by helicopter or foot patrol and a detailed climbing inspection every ten years on lines in

[21] CSA is the Canadian Standards Association. CSA provides the basis for some electric utility minimum designs.
[22] Interview with Director of T&D Assets, January 27, 2005.

service 20 or more years.[23] NSPI's inspectors also perform climbing inspections every two years on critical structures, such as those at major water crossings, and perform foot patrol inspections on each newly built line and structure within the first month of energizing.[24]

In addition to the scheduled inspections, NSPI usually performs reactive inspection patrols whenever a line has been exposed to a multi-phase fault or repeated ground faults, even if the line automatically re-energizes. Also, following numerous faults caused by adverse weather, NSPI assesses the condition of its transmission system by re-inspecting all lines exposed to the adverse weather.[25] For locating faults, NSPI has 19 digital fault locators and numerous distance-to-fault measuring microprocessor-based relays capable of remote access.[26]

NSPI's transmission line inspection sheets call for the identification of hazards and encroachments, and inspection for conductor, sky wire,[27] structure, and hardware exceptions (defects). Inspectors also collect vegetation data, measure line sags,[28] and test poles.[29] The inspection sheets used by the inspectors are specific to the type of structure and the type of inspection. For each type of structure and inspection there are about 20 or more major inspection exception categories and numerous subcategories of items to inspect.[30] Inspectors prioritize each exception identified in one of the following four categories:

- Immediate – repair during the next 48 hours to 1 month period
- This year – repair during the next 1 to 6 month period
- Next year – repair during the next 6 to 18 month period
- Greater than 2 years – flagged to Engineering for review and possible inclusion with other scheduled work.

Liberty reviewed completed structure and line inspection sheets for transmission line L6511. The structure detailed reports indicated exceptions and priorities for items such as broken insulators, pole rot, footing problems, and encroachments, and included information notes such as access problems and equipment needs, and exception priorities. The line inspection reports indicated line clearances and ambient temperatures, and comments about cross arm and structure exceptions.[31]

Four 2-man crews[32] made up of regionally supplied power line technicians (PLT) normally perform the foot patrol and climbing inspections. To assure consistent inspection results,

[23] For line sections that it cannot inspect by helicopter because of urban locations, or where minimum altitude requirements for helicopters make inspection impractical, NSPI foot patrol inspects annually.
[24] Response to Information Request IR-10, NSPI's current written Transmission Line Inspection Program MP 300.10, and interview with NSPI Manager of Inspections on January 27, 2005.
[25] Response to Information Request IR-10.
[26] Response to Information Request IR-67.
[27] Sky wires are aerial ground wires.
[28] Temperature is also measured. Inspectors compare measured sag and temperature to a table to determine possible clearance violations. The Vegetation Management group also uses the sag measurements.
[29] NSPI inspectors "sound' poles by tapping with a hammer to identify hollow areas.
[30] NSPI's current written Transmission Line Inspection Program MP 300.10.
[31] Response to Information Request IR-15
[32] NSPI has seven trained two-man crews with ATVs usually available to perform both planned and reactive inspections. Inspection crews are usually the 1st crews to a sustained fault location.

inspection management, engineering, and lines specialists train the inspectors. Two regional supervisors with power line background perform helicopter inspections. Transmission inspection program supervisors, and sometimes engineering personnel, review inspector findings and priority judgments. T&D Asset management and others monitor program progress using NSPI's formal weekly inspection status reporting program. To assure consistency, and better company-wide work coordination and prioritization, NSPI centrally manages and funds the transmission inspection program.[33]

Prior to 2002, the individual regions managed and funded NSPI's transmission line inspection programs.[34] They inspected each region's lines at least annually by helicopter patrol or foot patrol,[35] and performed climbing inspections on specific structures exposed to extreme conditions every five years and on every tower every ten years. The inspection sheets were not as detailed as the current sheets.

In 2004 NSPI inspected 98 percent of its transmission system at least once under the planned program, in addition to the reactive system-wide inspections performed after the November 13-14 storm. In 2003 NSPI inspected 76 percent of its system in addition to the reactive system-wide inspection performed after Hurricane Juan. In 2002 NSPI inspected 74 percent of its system. This was first year for the new centralized inspection program and the planned inspection rate (km/day) was initially overestimated.[36] Planned transmission inspection completion rates for the regionally managed programs before 2002 were not available.

The following table shows NSPI's annual customer operations expenditures for all T&D and call center work.

	$Million				
	2000	2001	2002	2003	2004
Operating	65.0	67.8	64.5	72.1	67.4
Capital	60.4	67.1	35.3	49.3	45.0
Total	125.4	134.9	99.8	121.4	112.4

Average operating funding has remained somewhat consistent at about $68M per year since 2001. NSPI's annual expenditures for transmission inspections are included within the figures in this table. Inspections did not have centralized funding until 2003. Transmission line inspection costs for 2003 and 2004 were about $650,000 and $580,000, respectively.[37]

Before the November 13-14 storm, NSPI had inspected all 11 lines affected by the storm. During the 2002 to November 13, 2004, period, all lines were foot patrol inspected at least once (two lines were foot patrol inspected more than once), and eight of the lines had been helicopter inspected.[38] NSPI repaired some of the exceptions identified before November 13, 2004.[39] None of the exceptions identified contributed to the November storm outages.

[33] Interview with NSPI Manager of Inspections, January 27, 2005.
[34] Central lines specialists did provide guidance to regional inspection management.
[35] NSPI indicated that in 2000, foot patrol inspections were increased and helicopter inspections decreased.
[36] Response to Information Request IR-16.
[37] Interview February 22, 2005.
[38] Response to Information Request IR-12.
[39] Appendix 10, NSPI Report to the Nova Scotia Utility and Review Board, January 18, 2005.

NSPI reported that it also performed additional foot patrol and helicopter inspections, as needed. For example, it performed inspections during and after the November storm on structures and lines that the storm may have stressed.[40] It also reported that it performed detailed climbing inspections of structures on either side of structures that collapsed during that storm.[41]

NSPI's substation technicians inspect monthly its substations, and annually perform infrared inspections on substation equipment, as well as transmission line terminal equipment.[42]

2. Conclusions and Recommendations

NSPI's transmission inspection program complies with good North American utility practices, and it appropriately monitors the condition of NSPI's transmission system.

NSPI's planned transmission inspection program includes annual system-wide helicopter or foot patrol inspections, biannual climbing inspections of critical structures, and once every 10 year climbing inspections of structures more than 20 years old. NSPI performs additional inspections as necessary after line faults and major storm events. Numerous fault location devices assist inspectors timely locate line faults.

NSPI has substantially complied with its planned transmission inspection program. Non-compliance was due either to program reorganization, or because it replaced some planned inspections with reactive inspections needed after Hurricane Juan.

NSPI had inspected all lines affected by the November 13-14 storm at least once and some twice since 2002. NSPI repaired defects identified by these inspections by the date of the storm or the defects could not have contributed to damage caused by the storm. During or just after the storm NSPI performed helicopter inspections of all lines affected by the storm, and performed climbing inspections of towers on either side of collapsed structures.

Since 2002, NSPI has centrally managed and funded the program. NSPI has fully staffed the transmission inspection organization and formally documented the organization's processes. Inspectors are experienced power line technicians or inspection supervisors, and have had appropriate training. Defect prioritizing and repair schedules are appropriate.

Liberty has no recommendations related to NSPI's transmission inspection program.

[40] Response to Information Request IR-8.
[41] Interview with Director of T&D Assets, February 10, 2005.
[42] Interview with Engineering Manager, January 27, 2005.

C. Transmission System Maintenance

1. Background and Analysis

A utility must maintain the transmission system for it to reliably perform its functions. Preventive maintenance practices are proactive actions (inspections and servicing) taken to detect and prevent component deterioration and failure. Corrective maintenance practices are actions taken to repair or replace deteriorated components identified by preventive maintenance and reactive actions taken to prevent system failures resulting from component deficiencies. As noted in the previous section, NSPI's inspectors identify and prioritize transmission line, structure, and hardware exceptions (defects) that need corrective maintenance. To assist with the corrective maintenance work, inspectors note equipment, tools, and access requirements on the inspection sheets. Using its work management software, NSPI generates a corrective maintenance work order, validates priorities, repair time estimates, and resource needs.

NSPI assigns most of the planned transmission corrective maintenance work to contractor crews.[43] NSPI tracks its corrective maintenance work to completion with its biweekly work plan reporting process involving work planners, engineering, and work force management.[44] NSPI's transmission inspection, engineering, work planning, and work force management groups interact in an integrated manner to identify critical system needs, and schedule and track maintenance work.

Before the November 13-14 storm, NSPI had either completed or scheduled corrective maintenance needs identified before the storm on the eleven transmission lines affected by the storm. Those items scheduled but not completed did not directly relate to the structure collapses or outages that occurred in the November storm.[45]

To identify possibly weak wood transmission poles, NSPI inspectors currently inspect and perform sounding[46] tests on its transmission poles as part of the foot patrol inspections. The inspectors tag poles identified as possibly not having at least 3 inches of shell thickness or insufficient circumference.[47] Tagged poles are not necessarily weak poles, but are poles that need more scrutiny. NSPI estimates that it has about 900[48] (about 1.9 percent) tagged poles, out of 47,450 wood transmission poles. NSPI gives priority to line sections with a large number of tagged poles for general upgrade. However, NSPI re-evaluates each tagged pole during each foot patrol inspection cycle. Then, inspectors double tag poles that they determine to be weak, and work management schedules them for replacement. Currently NSPI has only 13 poles that are double-tagged and scheduled for replacement.[49]

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[43] Interview with the Manager, Engineering, January 27, 2005.
[44] Response to Information Requests IR-10 and IR-17.
[45] Response to Information Request IR-65.
[46] Poles are tapped with a hammer to identify hollow spots if a pole.
[47] For many North American utilities, poles with 2 inches of shell thickness are considered as reject poles. Poles with only 1 inch of shell thickness are considered at too weak, and are priority reject poles. NSPI's 3-inch criterion is very conservative.
[48] Interview with Director, T&D Assets, January 27, 2005.
[49] Interview with Inspection Manager, February 21, 2005.

Until 2002, in addition to its regular inspection cycle, NSPI had been using a contractor to inspect, test, and treat on a 10-year cycle, transmission poles at least 15 years old. They inspected poles at ground lines requiring removing soil, and bored for internal inspection to apply a fungicide and for determining shell thickness. NSPI reported that all candidate poles had been treated up to then, and about one-third had been treated a second time. NSPI reported that, after evaluating cost-benefit, it is now planning to restart the contractor pole test and treatment program in 2006.[50]

NSPI evaluates every forced transmission interruption for correct protective relay scheme operation. It investigates and corrects improper operations records then in the "Incidents Under Review" report.[51] NSPI reports 230 kV and 345 kV relay misoperations and corrective actions to NPCC. NSPI tests and maintains its 230 kV and 345 kV relays every two years in conformance with "NPCC Maintenance Criteria for Bulk Power System Protection A-04." The completion rate for its bulk power relay testing has been 100 percent for each year since 2000. NSPI reported that it tests the remaining transmission line and bus protective relay by exception. That is, a relay is tested, and repaired or replaced with a microprocessor relay if it mis-operates.[52] NSPI reports that it does not have a high rate of 69 kV and 138 kV relay failures. NSPI reported that no transmission line relays mis-operated during the November 13-14 storm,[53] even though older style electromechanical relays protected all of the 69 kV lines and some of the 138 kV lines affected by the storm.[54] The relay schemes for the lines that were involved in storm outages are normal utility designs.[55]

NSPI has a specific maintenance standard for broken transmission line insulators, which are susceptible to breakage by vandalism.[56] To minimize insulator damage, NSPI reported that it is replacing glass insulator strings with polymer insulators. When it identifies broken insulators, the time-to-replace primarily depends on the number of broken insulators in a string of insulators, and the line voltage. Even when the number of broken insulators is not sufficient to warrant replacement within a specific time, NSPI schedules insulator replacements with other work on the line.[57]

NSPI identifies and tracks its manpower resources in terms of man-days. During 2003 NSPI completed about 1000 man-days of planned transmission corrective maintenance work. At the end of 2003 about 40 man-days (4 percent) of this planned work was not compiete and backlogged for completion in 2004. During 2004 NSPI worked about 1670 man-days of planned transmission corrective maintenance work. At the end of 2004 about 57 man-days (3.4 percent) of this work was not compete and backlogged for 2005. NSPI reported that deferral of these jobs was caused by work plan disruptions such as adverse weather.[58]

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[50] Interview with Inspection Manager, February 21, 2005.
[51] Response to Information Request IR-29.
[52] Response to Information Request IR-28.
[53] Interview with Manager, Engineering, January 27, 2005.
[54] Response to Information Response IR-27.
[55] Response to Liberty's Information Request IR-27.
[56] NSPI's Transmission Maintenance Practice 400.C, 1996.
[57] Interview with Inspection Manager, February 21, 2005.
[58] Response to Information Request IR-18.

NSPI has a formal preventative maintenance program for its substations which includes monthly inspections, quarterly and annual inspections and tests on battery banks, power transformers, and circuit breakers, and complete testing and maintenance on transformers, circuit breakers, and power cables on 4- to 6-year cycles. There are about 60 NSPI substation technicians who perform this work.[59]

Because the amount of new construction work was decreasing in the 1990s,[60] NSPI reduced its internal T&D[61] workforce resources from 281 full time equivalent (FTE) power line technicians in 1992 to 185 in 2004. However, starting in 1998 it began adding contractor PLTs to supplement its internal resources. It currently has 185 NSPI FTE power line technicians and 36 contractor-provided FTE power line technicians. This arrangement allows NSPI to use its workforces for baseline work, and contractor workforces as needed during peak work activity and storm response. NSPI also has mutual assistance agreements with neighboring utilities in Canada and the United States for providing additional workforces for major storm response.[62]

NSPI maintains an emergency inventory of transmission poles, hardware, and conductor.[63] However, it does not maintain a supply of spare steel transmission towers because there are many different tower types, and there are differences among towers of the same type.[64] If NSPI had to repair a line immediately, it would temporarily replace failed steel towers with wood structures, as it did at Panuke Lake. If NSPI did not need to return immediately a line to service, it would wait until it received new towers. The Burnside towers, which NSPI did not need to re-energize immediately, required an 8-week delivery. For the November 13-14 storm, there were no delays for wood structures. In addition to the delivery time required for the Burnside towers, NSPI was short on inventory of the conductor (needed 15 km of conductor) for the Burnside towers.[65] The delivery time of this conductor was 10 weeks.[66] However, it did not need to take rush actions because the conductor was not needed until the towers were received and constructed.

As its primary sources of materials, NSPI maintains direct supply agreements with transmission equipment manufacturers, which provide it with access to a broad base of inventory, dedicated manufacturing time, and at competitive prices. NSPI obtains poles, conductors, transformers, and hardware primarily from one manufacturing source for each item, but it also has secondary source agreements with several manufacturers for each item and several distributors, as well informal reciprocal pole supply agreements with several utilities.[67]

[59] Interview with Engineering Manager on February 10, 2005, and Maintenance Practice No. 0.0., 2003/01.
[60] Interview with Director, T&D, February 10, 2005.
[61] T&D is Transmission and Distribution.
[62] Response to Information Request IR-37.
[63] Response to Information Request IR-38.
[64] Interview with Engineering Manager, February 8, 2005.
[65] Response to Liberty Information Request IR-41
[66] Response to Liberty Information Request IR-40.
[67] Response to Liberty Information Request IR-39.

2. Conclusions and Recommendations

NSPI's transmission maintenance practices substantially comply with good North American utility practices and are appropriate for maintaining the condition of the transmission system. Maintenance practices did not contribute to structure failures or outages occurring during the November 13-14 storm.

NSPI appropriately prioritizes, schedules, and corrects line defects identified by the inspection process. Planned transmission corrective maintenance completion rates were good in 2003 and 2004 and the amount of backlogged work was small in comparison to other utilities. NSPI's inspection, engineering, and work management personnel make a well integrated team, with good control on maintenance activities. Manpower resources are not an issue because contractors are used to complete most of the transmission maintenance work. Although NSPI could not provide specific figures on transmission maintenance funding, the high completion rate indicates that it has fully funded planned transmission maintenance.

Corrective maintenance had been performed on the lines affected by the November 13-14 storm and work scheduled but not complete did not directly contribute to tower collapses or outages.

The level and mix of NSPI and contractor PLTs, along with its mutual assistance agreements is appropriate. Although having more PLTs available may decrease restoration times during major storms, the expense of having more FTEs than needed for normal activities may not be justified.

NSPI's emergency transmission equipment inventory, and its material source agreements, are appropriate and did not contribute to the length of customer interruptions caused by damage to the transmission system during the November storm.

Liberty found no evidence that NSPI's staffing, maintenance, or inventory practices had any appreciable effect on the severity of the outages caused by the November storm.

NSPI should reassess two of its transmission system maintenance practices.

NSPI should re-instate soon its contractor pole treatment and test program because it extends the life of the transmission poles, and it provides a more thorough means (boring rather than just sounding) to appraise poles for shell thickness. NSPI indicated that it would re-instate this program in 2006. Liberty does not believe that the five-year pause in the program has been detrimental to the system's condition in the long run. A pole treatment and testing program on a 10-year cycle is good utility practice.

NSPI should re-evaluate its practice of testing 69 kV and 138 kV protective relays only after misoperations. It tests its 230 kV and 345 kV relays on a 2-year cycle. Most electric utilities inspect, clean, and test 69 kV and 138 kV electro-mechanical transmission relays on a 3-6 year cycle. Because NSPI reported that relay scheme malfunctions are rare, Liberty is not suggesting that NSPI must perform relay testing, only that it would be prudent to review cost-benefits of this practice.

D. Transmission System Vegetation Management

1. Background and Analysis

Contact of trees to power lines is a major cause of outages for most utilities. According to the Canadian Standards Association "Overhead Systems Standards,"[68] "Where trees exist near supply line conductors, they shall be trimmed, where practical, so that neither the movement of the tress nor the swinging or increased sagging of conductors in the wind, in ice storms, or at high temperatures will result in contact between the conductors and the trees. Where trimming is impractical, the conductors shall be protected as necessary to prevent damage and electrical hazards." A utility with the majority of its transmission system located forested areas must have appropriately maintained right-of-ways to provide reliable service. NSPI's transmission system consists of 5,200 km of lines in 16,500 hectares of right-of-way corridors. Only small amount of NSPI's 69 kV lines are located roadside.[69] Although about 95 percent of the system has vegetation, vegetation not requiring significant management covers 15 percent of the system. However, the remaining 80 percent of the system requires some form of vegetation management. NSPI currently uses herbicide[70] treatments on about 18 percent of the system. It manages the vegetation on approximately 62 percent of the transmission system by cutting, spraying, mowing, and trimming.[71]

During 2004, NSPI had 11 tree-caused, sustained transmission outages, all on the 69 kV system. Two or three of these outages occurred during the November 13-14 storm. These were caused by trees felled by snow load and wind located outside the right-of-ways. There were three transient outages definitely caused by trees during the storm and others reportedly caused by "wind and snow." Liberty suspects that wind blowing tree limbs covered with snow into lines caused some of these outages.

In the early 1990s, NSPI maintained its transmission right-of-way vegetation on an approximate 7-year cycle. However, the Company prioritized the planned vegetation management work on the basis of the costs and benefits, and therefore did not manage all line sections on the 7-year cycle. NSPI used reactive hot spot trimming when trees presented an immediate hazard or had caused outages. By 1998, NSPI determined that trying to trim every transmission line section on a time cycle was not cost-effective, and had started basing its vegetation management program and budgets primarily on the results of the annual system inspections, line outage history, forester knowledge of the transmission system, and cost per customer outage prevented.

In 1998, NSPI formalized its proactive need-based vegetation tactics and developed its integrated vegetation management (IVM) program. The goals of this method are to: (1) reduce vegetation management needs by increasing the amount of vegetation compatible[72] with the system, (2)

[68] Section 3.1.7 "Tree Trimming."
[69] Interview with Vegetation Management Manager, February 23, 2005. The roadside 69 kV is located in Halifax and Sidney.
[70] NSPI reported that it has a 10-year blanket approval for its use of herbicides.
[71] Response to Information Request IR-21.
[72] Compatible vegetation is any species by nature of its growth and location that will not pose a threat to the transmission system. For example, NSPI has campaigns promoting public planting of blueberries and Christmas trees within its right of ways.

improve both reliability and cost-benefits by forecasting clearing, trimming, and herbicide needs, and (3) apply optimum methods to prevent incompatible vegetation[73] from growing to within NSPI's Normal Limits for Approach for Qualified Personnel[74] (1.5 m for 69 kV and 1.8 m for 138 kV) from all transmission line conductors at 60° C sag.[75] NSPI planned to adjust the forecasts on the basis of transmission system inspection foot patrols and forester inspections. The plan was to have a vegetation inventory of entire transmission system and to be able to forecast vegetation management needs (trimming before trees and limbs contact conductors during storms) on the basis of vegetation growth rates and historical data, verified by inspections. NSPI said that it uses trimming and treating methods that it designed to provide proper clearances for 10 or more years. Because of the time required to build fully the vegetation inventory, NSPI could not fully apply the IVM program until 2005.

NSPI's transmission IVM program is now fully in place. NSPI had inspected its transmission system for vegetation species and completed a vegetation inventory divided into short line sections of homogeneous vegetation. NSPI also:

- graphically located the short vegetation sections on its GIS[76] mapping system
- identified known species growth rates based on data provided by the Province of Nova Scotia[77]
- recorded the history of trimming and treatments applied on its system
- implemented the software programs needed to forecast vegetation growth in each section and to optimize trimming and treatment
- identified line sags on its system
- had an on-going lines vegetation inspection program.

Until 2002, NSPI managed and funded transmission vegetation on a regional basis. Three foresters and four coordinators now centrally manage the integrated vegetation management program. Professional vegetation contractors perform trimming and treatment working under a unit rates structure for planned work, and under a time and material rates structure for unplanned but necessary work. They trim trees to no less than 5 m from any transmission line conductor.[78] The foresters inspect about 60 percent of the contractor's work. However, if they identify problems, NSPI said that the foresters might inspect all work on a line.

Although the program only addresses vegetation and trees within NSPI's transmission right-of-ways,[79] NSPI reported that it also inspects for and removes hazard trees[80] that may be adjacent to

[73] Incompatible vegetation is any species of tree or shrub that is likely to grow within 3.1 m of a conductor.
[74] NSPI Contractor Standard General Specification, VM-7.02, Sect. 6.
[75] Maximum sag, or drooping of the conductor line, is the calculated sag at 60°C.
[76] Geographic Information System.
[77] These data were originally prepared for the timber industry in Nova Scotia.
[78] Per NSPI's contractor standard specifications.
[79] NSPI's standard right-of-way widths are 20 m for 69 kV, 30 m for 138 kV, 38 m for 230 kV, and 48 m for 345 kV according to the response to Information Request IR-26.
[80] Hazard trees are trees adjacent to right-of-ways that are within NSPI's Normal Limits of Approach for Qualified Personnel or likely to fall on its own or during a storm and affect the operation of the system. The need and amount of side cutting depends of tree species.

the lines, including removing buffer strips.[81] In 2004, NSPI started intensified clearing of its right-of-ways to full width, side cutting[82] at the edges of its right-of-ways, using special equipment, and removing suspect trees outside the right-of-ways to prevent the intrusion of limbs from trees into the right-of-way.

In some locations, NSPI's 69 kV and 138 kV lines do not center in the right-of-ways. In 2004, NSPI started widening right-of-ways up to 10 feet on its 69 kV system, with permission, to provide the standard clearance from the lines to the right-of-way edges. It expended about $146,000 in 2004 for 69 kV right-of-way widening. It plans to spend about $350,000 in 2005 for right-of-way widening on radial 69 kV lines, those that most affect costumer service.[83]

Liberty observed that NSPI has numerous right-of-way issues to address, especially on its 69 kV lines. During its aerial assessment of the NSPI transmission system, Liberty observed that about 10 km of 69 kV line L-5532 from Digby to Big Falls routes along the road. Side clearances on this section appeared to be less than the 10 m[84] required for its 69 kV lines located on right-of-ways. A tree caused an outage on this line during the November storm,[85] and was the fifth and last interrupted transmission path to Annapolis Valley. This caused the interruption of all remaining load and hydro generation in the valley.[86] In addition, Liberty observed other locations, particularly in the western part of the province, where NSPI had not yet trimmed the 69 kV and 138 kV right-of-ways to full width.

NSPI completed vegetation work during 2002-2004 on all of the transmission lines in forested areas affected by the November 13-14 storm. NSPI has expended about $1.3 million for vegetation management work on these lines since 2000, and about one-half of this during the 2003-2004 period.[87] NSPI reported that it had completed 100 percent of planned transmission in every year such 2000.[88] The total transmission vegetation management expenditures (capital and operating) for each year since 2000 were:

2000	2001	2002	2003[89]	2004
$827,000	$1,374,000	$1,367,000	$2,106,000	$1,412,000

The 2005 budget for transmission vegetation management is approximately $2,000,000.[90]

NSPI said that current right-of-way widening and side cutting programs, along with the fully implemented IVM program, would result in reliability improvements over the next two years.

[81] After others clear land of trees in property adjacent to lines, buffer strips (a single line of trees) are sometimes left for aesthetic reasons. Wind is now not blocked and the trees in the buffer strip sometimes are blow into the lines, especially if loaded with snow and ice.
[82] Side cutting means that limbs are cut back outside the right-of-way such that they will not enter the right-of-way.
[83] Interview with Vegetation Management Manager, February 22, 2005.
[84] If this were new construction, NSPI would clear to 15m.
[85] Response to Information Request IR-50.
[86] Interview of February 15, 2005.
[87] Response to Information Request IR-24.
[88] Response to Information Request IR-22.
[89] NSPI reported it brought forward into 2003 the mowing of right-of-ways planned for 2004 causing increase in expenditures.
[90] Interview with Vegetation Management Manager, February 22, 2005.

NSPI expects to realize fully the economic benefits resulting from the IVM program in about ten years.[91]

2. Conclusions and Recommendations

Although tree contact caused some storm transmission outages, NSPI's transmission vegetation management program is substantially consistent with good utility practice. However, NSPI needs to complete its program to clear, widen, and side-cut its transmission system right-of-ways. It should also verify that its vegetation management program uses full operating ratings of all lines.

Even though snow-laden trees blown into the radial 69 kV lines caused some customer interruptions during the November 13-14 storm, NSPI's vegetation management program was appropriate for normally expected storm conditions. This storm placed sufficient snow, ice, and wind on the transmission system to collapse towers. In fact, it is surprising that more damage from trees located outside the right-of-ways did not occur during the storm. However, NSPI will reduce the possibility of outages caused by trees outside the right-of-ways because it started intensifying the removal of hazard trees and side cutting and widening of its right-of-ways even before the storm. It plans to continue these programs with priorities based on the effect on reducing customer interruptions. Hazard tree removal, side cutting, and right-of-way widening is appropriate and good utility practice.

Liberty identified these specific concerns:

- Conductor sag depends on loading and resulting temperatures. NSPI trims trees to provide clearances to conductors operating at 60°C. However, NSPI rates the lines to operate at 49°C, 60°C, or 100°C. Liberty's concern is that NSPI may operate a line rated at 100°C at its full rating. NSPI should modify its vegetation management or operations ratings tables to prevent tree contact on lines operated at high temperatures.
- There are numerous locations on NSPI's 69 kV and 138 kV right-of-ways that need trimming to full width, and, in some cases, past full width to provide good reliability. NSPI should verify that it is providing sufficient funding to assure that it addresses timely right-of-way vegetation issues, and prioritizes its right-of-way clearing, widening, and side-cutting work based on effect to customer service reliability.

Although NSPI's vegetation management program had been in transition since 1998, the program was reliability based, fully funded, and fully completed each year. NSPI's integrated vegetation management program, now fully implemented, should improve transmission reliability in the long run by maximizing the effectiveness of vegetation management funding. Although it requires intense management to attain full effectiveness, it is appropriate and is good utility practice.

[91] Interview with Vegetation Management Manager, February 21, 2005.

Most electric utility transmission vegetation management programs are cycle-based. That is, utilities perform trimming and treating of the entire system over a typical four-year cycle. Although annual planning of cyclic-based vegetation management is relative easy to plan, these programs are not as cost-effective as are need-based programs. Slow growing vegetation and trees may be trimmed or treated too often, while those that are fast growing are not trimmed or treated often enough. Often utilities do not have sufficient funding to comply fully with their programs, and fast growing species cause nuisance outages and require expensive reactive hot spot trimming.

NSPI has chosen to maximize the effectiveness of its transmission vegetation funding by implementing its need-based Integrated Vegetation Management program. When vegetation funding is limited the need-based program, when properly managed, will provide better reliability than do cycle-based programs.

NSPI has met the preliminary requirements. It uses professional foresters to manage the program, who have taken advantage of the tree species' growth rates provided by Province of Nova Scotia. It has been monitoring the status of its vegetation growth and measured line sags. Its GIS transmission mapping system is in place, as are its vegetation inventory, and growth forecast and treatment optimization programs. However, to obtain fully the reliability benefits of the program, it will have to continue annual monitoring of vegetation growth system-wide.

III. Transmission System Planning and System Design

A. Transmission System Planning and Design

1. Load Forecasting

Background and Analysis[92]

Load forecasts make a determination of how much power the transmission system will have to carry. Liberty limited its evaluation of NSPI's load forecasting to the adequacy of the forecast for transmission system planning.

NSPI prepares a single load forecast for the entire province including the six municipal organizations that it serves. NSPI uses the load forecast for corporate purposes and it forms the basis for both system planning and system operating studies. It performs load forecasts for one to ten years in the future. Forecasting expertise resides in the NSPI corporate functional group.

The basis of NSPI's forecast consists of data supplied by the Conference Board of Canada, banking data, and end-use appliance data supplied by Statistics Canada. NSPI also surveys its largest 50 customers regarding their energy use plans. NSPI does not conduct formal discussions between forecasting personnel and the distribution regions. However, NSPI believes it captures the data as any new economic activity generates great interest. NSPI uses the Environment Canada 30-year average Heating Degree Days for its energy forecast. For peak load forecasts, NSPI uses the long-term average of the December-January minimum temperature at (-15 degrees C) as measured by Environment Canada at Halifax. It forecasts energy for three customer classes (approximately 950 MW residential load, 500 MW commercial load, 650 MW industrial load including 350 MW of interruptible load, and 150 MW of losses) and derives peak loads from projected energy values with the use of load factors and hourly peak load curves. NSPI produces its load forecast on the basis of average weather conditions and base economic forecasts. NSPI indicated that it considered optimistic and pessimistic economic views in previous forecasts. That capability still exists in the forecasting model, but it is not used.

NSPI adjusts its energy forecast on the basis of current economic conditions and fuel prices that transition its short-term energy forecast to the longer-term forecast. NSPI indicated that the so-called launch adjustment, which accomplishes this transition, is less than 50 GWH for each customer sector. The total system energy requirement is approximately 12,000 GWH. NSPI stated that its total forecast is accurate to within two percent. NSPI also stated that the cold weather of January 2004 resulted in NSPI's actual energy exceeding the forecast by 4 percent and actual peak load exceeding the forecast by approximately 6.5 percent.

Corporate forecasters give transmission system planners forecasted energy and peak loads for the system. Planners use the corporate forecast for load distribution purposes. Planners perform load checks on all 25 kV feeders, adjust for distribution and transmission losses, and prorate values to actual loads experienced at a substation. Planners forecast reactive load based on actual load

[92] Interview of February 2, 2005.

experienced. Feeder studies use expected individual feeder loadings and transmission operating area studies use the expected area loads under minimum temperatures expected in the region under study. Planners evaluate system performance for all regions under expected winter peak-load conditions and summer peak load (80 percent of winter peak) with summer low hydro generation conditions.

NSPI's econometric forecasting model produces a load forecast for corporate purposes that it bases on average economic and weather conditions. In other words, the forecasted load has an equal likelihood of being too high or too low. While this probability of exceeding the forecast is adequate for corporate forecasting, it does not supply the planners with a consistent reference load needed for system design. Planners do consider actual loads and adjust for minimum expected temperature based on the probability of exceeding the forecast. However, each planner could use a different probability of exceeding the estimate.

Conclusions and Recommendations

NSPI's load forecasting is adequate for transmission system planning but has internal inconsistencies.

NSPI's load forecasting techniques did not affect the November outages. These outages occurred at a time of the year when loads are below peak.

The forecasting methods used by planners to forecast real and reactive loads for feeder studies and area studies are reasonable. However, planners do not have or use a forecast that has a consistent probability of being exceeded, *i.e.*, a consistent level of conservatism. Liberty recommends that NSPI's corporate load forecasters prepare a forecast that is appropriate for all planners to use directly. Liberty also recommends that the forecast include a variance from average economic conditions.

2. Planning Studies

Background and Analysis

Utilities mathematically model their power systems and use the models to test the system for a range of conditions and potential problems. The three major types of studies that use these system models are power flow, transient and long-term dynamic stability, and short circuit studies.

NSPI performs power flow studies to ensure that the loading on system components will not be beyond their thermal capabilities and those voltages will remain at levels adequate to serve customers and support the dynamic response of the system. It conducts power flow studies using a single-phase[93] representation of the system. NSPI uses a system representation maintained by

[93] This approach assumes that all three phases have balanced voltages and currents.

the Northeast Power Coordinating Council (NPCC) that models NPCC in its entirety. NSPI uses the PSSE power flow program, which is an industry-wide accepted software program.

The models represent transmission lines by impedance that includes mutual coupling between other lines on the right-of-way.[94] They represent transformers as impedance and transformer taps as fixed or variable. They represent generators as a constant real and a variable reactive power source, loads as constant real and constant reactive loads, and capacitors as voltage variant reactive sources. They model distribution load directly on the 138 kV and 69 kV buses and net distribution capacitor banks with the reactive component of the distribution load. NSPI only models capacitor banks that are under the control of the system operator at the 25 kV level with appropriate transformation.

NSPI performs stability studies to ensure that faults on the system can be successfully isolated while remaining in synchronism with the remainder of the electrical grid. It performs transient stability studies to determine the adequacy of the system response to the initial event and long-term dynamic analysis to determine the adequacy of the system response after long-term actions such as transformer tap changes have taken place and interaction between rotating masses has stopped. NSPI uses a similar system representation of the system to that used for power flow studies. In addition, they model in detail generators, their excitation systems, governor systems, and power system stabilizers. At the generating stations, the study models station service load without discretely modeling large motors, however, it does model the large motors associated with the largest industrial loads. NSPI has four units on its system that employ power system stabilizers to improve transient stability and long-term dynamic system response. It considers system simulations up to five seconds in transient stability analysis and simulations from 10 to 20 seconds in duration for long-term dynamic simulations. NPCC also maintains this system representation. NSPI uses the PSSE transient stability program, which is also an industry-wide accepted software program.

NSPI performs short circuit studies to ensure that the interrupting capabilities of circuit breakers are sufficient to interrupt the maximum expected fault duty on the system at that location. It also uses short circuit studies to help set some relays for proper operation and for single pole reclosing applications.[95] NSPI models Nova Scotia and New Brunswick in full detail including the mutual coupling of the transmission lines. NSPI feeds its model files from its PSSE applications into the ASPEN (Advanced System for Power Engineering Inc.) short circuit program. NSPI performs fault simulations for circuit breaker duties, voltage flicker, relay settings, and single pole reclosing with this software.

The software programs used by NSPI to study and plan its transmission system are the same or similar to programs used by all large electric utilities.

The system representations used by NSPI are the same representations used by all NPCC members as a starting base for system planning studies.

[94] Mutual impedance changes for each line configuration, including spacing changes in the right-of-way, so that transmission line impedance must be the sum of the impedance calculated for each configuration.
[95] NSPI has single pole reclosing on its four 345 kV lines and one 230 kV line.

NSPI represents the entire NPCC area in its power flow and stability analysis studies. It could simplify these models. However, Liberty recognizes that the savings in run time may not justify the effort. NSPI uses a detailed representation of New Brunswick and Nova Scotia for its short circuit studies.

The NPCC requires that members perform a five-year Area Transmission Review for the Maritime Area. This review consists of a systematic assessment of normal criteria and extreme contingencies, thermal loadings, voltages, relay operation, Special Protection System (SPS) operation, and system stability. NPCC also requires that members update Area Transmission Reviews should planned reinforcements change.

NSPI performed the NPCC 2001-2006 Area Transmission Review on October 29, 2001. NSPI also performed an intermediate review on September 30, 2003, to reflect changes to the system that it did not contemplate in the 2001 review. Those changes included the double circuiting of a 230 kV and 345 kV line across the Canso Causeway and the addition of an SPS to accommodate an increase in the Stora load.[96] Liberty reviewed both of these analyses. NSPI has scheduled its next Area Transmission Review for 2006.

NSPI conducts area-planning studies of its system on an as-required basis with a formalized process. This formalized process includes evaluation of economics and alternatives to solve voltage and thermal problems on the Secondary Transmission, Electrically Remote Transmission, and Distribution systems. It also performs area studies if circumstances within the area change altering required projects or their timing.[97] Liberty reviewed three recent area-planning studies.

In 2000, NSPI conducted a province-wide, long-range study that looked out to 2008. The prime purpose of the analysis was to determine system needs. However, NSPI also analyzed strategic issues, such as the potential for increased gas use, and their effect on the transmission system. NSPI stated that it would not determine the placement of new generation as placement will be market determined and that locational pricing will direct potential projects into an area of the system that provides economic benefits to customers.[98] Liberty reviewed this analysis.

NSPI conducts operating studies at the Energy Control Centre. These studies develop operating limits for the system and changes to those operating limits that are required to perform maintenance, repairs, or new construction. NSPI performs these studies on an on-going basis.[99]

[96] Interview of February 15, 2005.
[97] Interview of February 15, 2005.
[98] Interview of February 18, 2005.
[99] Interview of February 3, 2005.

Conclusions and Recommendations

NSPI's transmission planning studies are adequate and did not contribute to the effects of the November storm.

NSPI's models, the size of its system representation, the manner in which it represents its system, and the software it uses generally represent good utility practice.

The models employed by NSPI for its system analyses are suitable for the prediction of reasonable study results.

NSPI can further increase the voltage variant accuracy of its analyses by modeling of the 25 kV buses in the power flow and stability programs and representing distribution real load, reactive load, and distribution capacitors discretely on those buses.

System modeling did not contribute to the November 13-14 customer outages. System loads were low at the time that the major storm occurred. Loadings on system equipment were well below that expected for system peak conditions.

NSPI performs an adequate number of studies to meet NPCC requirements and that study frequency is appropriate.

NSPI performs an adequate number of area planning studies and that study frequency is appropriate.

Although NSPI is not performing system studies for placement of new generation, Liberty concluded that such action is appropriate. Liberty believes that long-range transmission system analysis of the future will take the form of interconnection analysis for new generation and determination of locational pricing values.

3. Design Criteria

Background and Analysis[100]

Utilities design electric power systems in accordance with reliability standards that require that power flows remain within equipment capabilities, that voltages remain adequate for customer use, and that the systems remain stabile after certain failures (contingencies) occur. NSPI designs its transmission system to two sets of system design criteria.

First, the North American Reliability Council (NERC) established minimum transmission system design criteria for members to use in the design of power systems throughout North America. NERC simply requires that utilities design the power system to lose an element without the loss of load. This criterion does not apply to radial portions of the system. NERC delegates the supervision of transmission system design to its regions or reliability councils. The Northeast

[100] Interview of February 2, 2005.

Power Coordinating Council (NPCC) is such a region and it covers the Northeastern portion of North America. Specifically, NPCC members are New York, New England, Ontario, Quebec, and the Maritime Power Pool. NPCC established its own transmission system design criteria that are more stringent than that of NERC. NPCC requires that its members use its "Basic Criteria for Design and Operations of Interconnected Power Systems" in the design and operation of their Bulk Power Systems.[101] The NPCC criteria include requirements for the design and operation of Special Protection Systems (SPSs).

Second, for facilities NSPI does not consider part of the Bulk Power System and thus not subject to NPCC criteria, NSPI uses the design criteria in its own document "Capital Expenditure Justification Criteria." NSPI classifies its transmission as Primary Transmission (same as Bulk Power System), Secondary Transmission, and Electrically Remote Transmission.

NSPI determined that its 345 kV transmission system, its 230 kV transmission system except for the 230 kV facilities to the west of Halifax, and portions of the 138 kV system that connect generation to the transmission system are Bulk Power System elements. NSPI designs and operates these facilities to NPCC criteria. NPCC requires that design studies consider maintenance, forced outages, stressed generation conditions, stressed transfer conditions, and transmission line reclosing. Under these conditions, the system must be able to withstand representative faults and disturbances. Such disturbances could take the form of the loss of an element in normal clearing time, delayed clearing, faults on circuit breakers, and circuit breaker failure associated with an SPS. The system must remain within applicable thermal and voltage limits. NSPI uses 95 percent to 105 percent of system nominal voltage as its acceptable voltages range. NPCC also requires that the system restore to a secure state (the ability to withstand the next most severe contingency) within 30 minutes even if the system operator is required to intentionally shed firm load to do so.[102]

All of NSPI's SPSs employed on the bulk power transmission system conform to NPCC requirements.[103] NSPI operates an SPS for faults on the 345 kV line that ties Nova Scotia to New Brunswick when imports are above predetermined limits to maximize economies for its customers. This SPS will cross trip the remaining lower voltage tie lines. In addition to the two levels of automatic under-frequency relaying[104] required by NERC and NPCC, NSPI has installed a third level of under-frequency relaying to permit the import of additional power. NSPI indicated that activation of this third-level protection could interrupt up to 125,000 customers if a fault on the New Brunswick 345 kV tie line were to occur and importing amounts were above the amount protected by the SPS. This SPS has not operated under these conditions in the last five years.[105] NSPI also stated that the NPCC accepts this practice because the layout separates Nova Scotia electrically from the remainder of the North American grid for this condition and is then not required to be in conformance with their design and operating criteria.[106]

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[101] Generation and transmission on which faults or disturbances can significantly affect other systems.
[102] Interview of February 2, 2005.
[103] Response to Information Request IR-63.
[104] Under-frequency relaying automatically disconnects customers when the frequency drops. This action reduces system load allowing frequency to be restored to normal levels.
[105] Response to Information Request IR-64.
[106] Interview of February 2, 2005.

Secondary Transmission includes the remaining 230 kV and 138 kV facilities that are not part of the Bulk Power System and certain 69 kV elements. The remainder of the 69 kV is the Electrically Remote Transmission system. In the design of its Secondary Transmission system, NSPI studies both transient and static conditions. NSPI simulates bus faults and faults where the protective relays fail to operate as intended. For a stable system, the study results must show that the system is returning to normal. It designs the Secondary Transmission system to withstand the loss of a single element without cascading loss of load. Voltages must remain within the range of 90 percent to 110 percent of system nominal values and equipment must remain within applicable ratings. Most of the Electrically Remote transmission system is radial, and therefore NSPI cannot design it to lose elements without the loss of load. NSPI has no formal policy on when it should loop the load served by radial transmission but recently performed system alterations that reduced a 70 MW radial load to 50 MW.[107]

Conclusions and Recommendations

NSPI's transmission system design criteria are adequate but could be improved.

NSPI has no formal transmission looping policy for load served by its radial transmission system (Electrically Remote transmission). Many utilities adopt a load value or a load value multiplied by distance that, if exceeded, requires additional transmission facilities. However, the radial nature of the NSPI lower voltage transmission system emanating from its backbone transmission system requires a different approach. Liberty recommends that NSPI develop an integrated radial transmission policy that considers the economics, the line performance, the load served, and the reliability benefit of new transmission facilities that would improve reliability compared to other projects and alternatives. Such alternatives could include things as enhanced vegetation control or radio controlled switching or other actions that could improve reliability in steps.

NSPI's two transmission design and operating criteria are adequate for the design and operation of a reliable power system except for the use of 110 percent high voltage for the design of the Secondary Transmission system. Most manufacturers design their equipment to operate at no higher than 105 percent of nominal values. Liberty recommends that NSPI use the manufacturers' high voltage design limit unless it has specific analyses that supports the use of a higher value.

NSPI's application of a third level of under-frequency protection on the New Brunswick tie permits a higher level of import but would interrupt many customers if activated. The load shedding for a single contingency is inconsistent with the remainder of NSPI design and operation of the Bulk Power System and NPCC design and operation criteria. Other parts of the system include facilities that will protect against contingencies that are much more severe and much less likely to occur than the loss of a single element that could activate the third level of under-frequency load shedding. Liberty understands that operation of the NSPI system in this manner for this one contingency potentially translates to significant savings for NSPI's customers. However, Liberty recommends that NSPI design and operate its bulk power system to

[107] Interview of February 2, 2005.

NPCC criteria unless specifically authorized by the Nova Scotia Utility and Review Board to do otherwise.

4. Equipment Ratings

Background and Analysis

Components in the transmission system have the capability to carry a limited amount of current before equipment failure. Equipment ratings provide the limits that, if not exceeded, will prevent such failures. Utilities should have appropriate ratings for transmission system components and should know the conditions that could cause it to exceed these ratings. In most cases, the current-carrying capability of components is dependent on parameters such as ambient temperature, the length of time it carries that current, and the loading on the component prior to the requirement to carry an elevated current. Some equipment ratings are fixed and do not vary with these parameters.

As CSA[108] standards have changed through time, NSPI has changed the design temperature of its transmission lines. Until the mid-1970s, the CSA required that utilities design transmission lines to operate at a temperature of 49 degrees C. This temperature, along with the particular conductor selected for use, limits the power that a transmission line may carry while maintaining required clearances to ground.[109] NSPI used a line design temperature of 60 degrees C during this period. Most of the older transmission lines on the NSPI system are limited by their design temperature and are sag-limited. After the mid-1970s, NSPI used 100 degrees C for line designs. NSPI uses only one temperature when designing its transmission system and operates its transmission system to remain within those thermal capabilities or required ground clearances. This rating is called the normal or continuous rating. NSPI did not design short-term ratings that would allow higher currents for specified short periods into its transmission system. For design purposes, NSPI uses 25 degrees C ambient to calculate the summer normal transmission ratings and 5 degrees C ambient for winter normal transmission ratings. NSPI assumes no wind conditions, which would remove heat from the lines, and a solar heating effect when calculating conductor ratings.[110]

NSPI also uses CSA Standards, ANSI/IEEE Standards and Loading Guides, and manufacturers' recommendations for rating circuit breakers, disconnect switches, and other components on its transmission system. The method for rating each is different; however, the result is a continuous current rating that is compatible with conductor limits. NSPI assumes that any associated equipment such as splices, jumper loops, connectors, and clamps have equivalent or greater current carrying capability.[111]

[108] Canadian Standards Association.
[109] Higher current in transmission line conductors expands the conductor. Longer conductors increase the sag in the transmission line. Utilities establish minimum clearances to maintain safety of personnel. Minimum clearances also prevent unwanted contact with vegetation.
[110] Interview of February 2, 2005.
[111] Response to Liberty Information request IR 56.

Transmission lines cross over the distribution system in many places. NSPI closely monitors all changes in either the transmission or the distribution system to ensure that clearances of these crossings are adequate to maintain established transmission line ratings.[112]

NSPI's operators use the same transmission system ratings for system operations as those used for system design. In addition, operators employ what they call dynamic ratings to components of their transmission system that are thermally constrained. If the actual summer/winter temperature is above the design temperature, they de-rate facilities. NSPI does not increase ratings when summer/winter actual temperature is below the design temperature.[113]

The majority of NSPI's generation exists in the eastern end of the province. In this area, stability concerns generally limit the transmission system.[114] A stability-limited system does not use the full thermal capability of the transmission system and typically has more transmission capability in place than a system that is thermally limited.

Many utilities design their transmission system to operate at elevated temperatures for short periods. NSPI does not. NSPI designs its transmission system for a single maximum allowable temperature. This is a conservative approach.

Conclusions and Recommendations

NSPI's transmission component rating methods are consistent with good utility practice and are conservative when compared with other utilities.

Liberty is concerned with the NSPI assumption that all transmission line associated equipment such as splices, jumper loops, connectors, and clamps have equivalent or greater current carrying capability. Although NSPI matches the current carrying capability of this associated equipment for new construction, such an assumption may not be valid with older lines. In addition, undocumented system element changes may have taken place regardless of the age of the transmission line. Liberty does not believe that any of this associated transmission equipment contributed to the outages that occurred during November 13-14, 2004. However, Liberty recommends that NSPI review its thermally limited transmission system on a priority basis to ensure itself that associated equipment cannot act as fused links and fail.

[112] Interview of February 2, 2005.
[113] Interview of February 2, 2005.
[114] Interview of February 3, 2005.

B. Transmission System Operations

1. Storm Preparation and Energy Control Centre Actions

Background and Analysis[115]

NSPI implemented its new Emergency Services Restoration Plan (ESRP) in August 2004. The storm of November 13-14, 2004, was the first opportunity that NSPI had to use its new ESRP. The plan is predictive in nature and is duration driven.[116] That is, NSPI predicts the average number of customers to be out of service and the average duration that those customers will be out of service. It bases these predictions on historical weather and a range of outage data (*e.g.*, restoration times, resources required, number of customers out, and damage). NSPI uses the high end of the ranges and those predictions result NSPI initiating one of four levels of response. The Director of Control Centre Operations is responsible for making the determination of NSPI's response level prior to the event occurring. The table below shows the trigger values from the ESRP.

Emergency Restoration Plan Response Level Triggers

Response Level	Avg. Customers Out Over Outage Duration	Average Outage Duration (Hours)	Notes
1	<50,000	<12	Storm Lead in Region Only One region Impacted
2	<50,000	<36	Storm Lead in Region Multiple Regions Impacted
	>50,000	>24	
3	<50,000	>36	Storm Lead Centralized Multiple Regions Impacted External Resources From NB and NE Required
	>50,000	<72	
4	>50,000	>72	Storm Lead Centralized Multiple regions Impacted External Resources Required From NB, NE, and HQ Required

NSPI activated the ESRP three times since the November storm and initially called all as potentially level 3 events. On one occasion, a level 3 event resulted and, on the other two occasions, no actual emergencies occurred. NSPI believes that they conservatively and consistently implement the ESRP.

[115] Interview of February 3, 2005.

[116] NSPI upgrades the response as the average number of customers expected to be out of service increases for longer periods.

On the afternoon of November 13, NSPI ran its model and predicted a level 2 event based on the 4 pm forecast published by Environment Canada.[117] Environment Canada is hard-wired to the Energy Control Centre such that if any changes to weather watches and warnings occur, an alarm sounds. NSPI was also monitoring the weather radar loop and that loop was showing a snow, rather than an ice event. NSPI took appropriate measures for a level 2 response.

At 8 pm the weather radar loop still showed a snow event. NSPI had 17,000 customers out of service and re-ran its prediction model with updated outage information. NSPI reaffirmed a level 2 response at this time.

System operators stated that the weather radar loop continued to show a snow event throughout the evening. The first indication that operators had of a major storm event was the tripping of a multitude of metro area transmission elements in the early morning hours of November 14. System operators called in Energy Control Centre management at approximately 2:30 am. By approximately 4 am on November 14, it became evident that a level 3 event was occurring. NSPI called the level 3 response on a 5 am scheduled storm call.

NSPI operates and switches its transmission system from three consoles during a storm of this magnitude. The 69 kV transmission system in the western part of the province is under control of the hydro operator, as it needs to be coordinated with the multitude of hydro stations in this area. The hydro operator also coordinates his actions with the transmission operator. The switching console handles all switching to relieve the transmission operator of these duties. These activities are also coordinated with the transmission operator. The transmission operator retains overall control of the transmission system.

Transmission facilities began to fault and trip just after midnight on November 14, 2004. System operators called for line patrols. By approximately 3 am system operators were aware that the amount of facilities involved with the storm was becoming significant, were increasing, and that a major outage was occurring on the system. At that time, on-duty personnel called in the Control Centre director and supervisor. This was in accordance with System Operating Practice 7.1, System Notification Procedure.[118] System operators were also in contact with the relay engineer who aided in the location of faults using fault indicating device data.

The Energy Control Centre is responsible for all transmission and generation switching and dispatching. It is the Energy Control Centre's policy to record all incoming and outgoing conversations. Liberty listened to a large sampling of control room taped conversations of the transmission operator and the energy operator recorded throughout the duration of the November storm.

The number of calls with field personnel, large customers, and generating stations related to the large number of transmission outages and the constantly changing system conditions between 3

[117] This is the last forecast for the day.

[118] The System Operating Procedure also calls for notification of the Control Centre supervisor prior to this time. Operators did not need to do this because the supervisor was already on call due to the pre-staged Level 2 restoration status implemented the prior evening.

am and 6 am on November 14 nearly overwhelmed the transmission operator. As load was lost, operators balanced generation. Field crews were reporting difficulty getting to faulted areas.

At about 6 am, the 345 kV line tie line to New Brunswick tripped resulting in the isolation of Nova Scotia from New Brunswick. At this time, the Special Protection System associated with this line received an incorrect signal from a bad circuit board and one unit at the Lingan Generating Station tripped. The system operator intentionally dropped approximately 18,000 customers to keep system frequency under control.[119] From this point of time until operators reconnected Nova Scotia to New Brunswick, the system operator prioritized his activities on the transmission system. He gave 69 kV and 138 kV outages a low priority and full attention to the backbone system, balancing load and generation on the system. Operators restored power to the customers intentionally interrupted one hour earlier.

At about 1 pm, the fifth transmission line into the Annapolis Valley tripped, interrupting the remaining portions of the western province. At 2 pm on November 14, the remaining 345 kV line into Hopewell substation tripped, isolating the Trenton Generating Station. This was the last major transmission system event and it led to the peak coincident number of customers out of service.

The energy operator and the transmission operator were continuously having conversations with generating plant personnel and major customers to adjust load or generation to changing system conditions.

Operators observed system operating limits for transfer levels on the New Brunswick tie. Internal transfer limits or generating station limitations are determined for all lines in service or for an element out of service. The multitude of transmission contingencies placed operators in a position of operating generation and transmission without regard of coverage for the next contingency. All SPS systems remained in service but transfers never reached the levels that required arming them as the storm occurred at a condition of approximately 50 percent of peak load and the system lost additional load during the event.[120]

Good system operation requires that system operators retain control during emergency events. The operators at the Energy Control Centre did so. Liberty agrees with the transmission system operator's decision to prioritize outages, trip firm load to control system frequency as required by the Northeast Power Coordinating Council when under emergency conditions, and to place frequency control as the prime directive. These actions allowed as much of the transmission system to remain energized as possible resulting in fewer customer outages and overall shorter outage duration.

As major transmission outage events unfold, conditions thrust system operators into unknown operational territory, as operating guides cannot be prepared for every potential system operating condition. In these emergency conditions, operators must rely on their experience, training, and

[119] If generation exceeds loads, frequency will rise above 60 Hertz and if load is greater than generation, frequency will fall below 60 Hertz.

[120] A bad circuit board did send an incorrect signal to an SPS that tripped one unit at the Lingan Generating Station while transfers were below arming levels.

judgment. Liberty did not discover any actions taken by system operators that it would consider unsafe.

Conclusions and Recommendations

NSPI made the correct initial response level prediction according to its ESRP and the available weather information.

NSPI performed appropriate updates to its response plan level. Liberty found that NSPI operators had no indication of the changing character of the November 13-14 storm from snow to ice until transmission outage events occurred during the early morning hours of November 14, 2004.

NSPI's system operators acted properly and professionally throughout the November storm.

System operators exercised excellent judgment and operated the system within appropriate limits.

2. Fault Indication, Monitoring, and SCADA

Background and Analysis

Fault indication devices can have a variety of forms. They can be target flags on relays, oscillographs that record fault information, digital fault recorders, and the memory in the newer programmable relays. Liberty's focus here is on the newer technology digital and programmable devices that do not require the physical presence of an operator at the substation to retrieve fault data.

NSPI maintains 19 digital fault recorders strategically located at substations across the province. The fault recorders transmit their recorded data to a central master station located at the Ragged Lake Control Centre. Personnel at the Energy Control Centre analyze these records with software to determine distance to faults from the substation. In addition, NSPI located programmable relays manufactured by Schweitzer Engineering Laboratories (SEL) on 70 line terminals.[121] NSPI can also access the stored data in these relays via voice or dial up modem to analyze fault location information.[122] No communication failures occurred at the Control Centre during the November storm.[123]

[121] The connection of a transmission line to a substation.
[122] Response to Information Request IR-67.
[123] Interview of February 2, 2005.

NSPI also employs Special Protection Systems[124] (SPS) that maximize the efficiency of the transmission system while remaining in compliance with reliability standards. NSPI continuously monitors the arming points of each SPS. NSPI also monitors the flows between Cape Breton and Halifax at various locations and between Nova Scotia and New Brunswick, and maintains those flows within specified ranges. NSPI accomplishes all monitoring through the Energy Control Centre.[125]

The NSPI transmission system is compact and centered on loads fed in a radial layout from a backbone transmission system. The 19 digital fault recorders and the 70 installations of SEL relays provide a wealth of fault information to system operators.

When aggregated, the fault recorders and SEL relays can trace faults on 34-69 kV line segments, 40-138 kV line segments, 21-230 kV line segments, and 5-345 kV line segments. These fault recorders and relays cover the vast majority of the NSPI transmission system and allow fault locations to be determined almost anywhere on the system.[126]

During typical fault conditions, where only one permanent disturbance occurs, NSPI could locate virtually all faults on the transmission system and initiate proper operator or repair actions. During the November storm, conditions on the system were not normal. Multiple contingencies occurred on the same transmission facilities. One of the inherent characteristics of any monitoring device is that once the facility is out of service due to faulted conditions, monitoring devices do not record subsequent faulted conditions.[127] Until personnel can perform a system damage assessment, the system operator is not aware of all faults that have occurred. Initial faults mask subsequent faults within the faulted line potentially delaying restoration. Such conditions are likely to exist during major storms.

During the November storm, all SPSs were in service, but operators kept transfer levels below levels that armed them. Such action placed the system in a secure state.[128] SPS systems in place on the NSPI system do not merely isolate outages or minimize outage areas. NSPI employs SPS to perform system security. NSPI minimizes outage areas and isolates disturbances with line relays in a manner similar to that used by all electric utilities. On the looped backbone transmission system, single elements are isolated. On the radial portions of the transmission system, single disturbances initially interrupt the entire circuit. The Energy Control Centre can isolate portions of the system to restore service.[129]

SCADA (System Control and Data Acquisition) allows system operators to view remotely real time system variables such as voltage, transformer tap position, connection status, and power flows at remote locations. Historically, local personnel performed this function with telephone communications between the local operators and the system dispatcher. SCADA in NSPI's

[124] A Special Protection System is one that institutes additional system action beyond that required to isolate the faulted element(s).
[125] Interview of February 2, 2005.
[126] Response to Information Request IR-67.
[127] If a transmission line faults and successfully recloses, operators can maintain fault location data for multiple faults.
[128] Interview of February 2, 2005.
[129] Interview of February 2, 2005.

power system periodically[130] scans system variables and transmits data to the Energy Control Centre. System operators monitor desired parameters at their control consoles.

The NSPI Energy Control Centre at Ragged Lake is the focal point for operation of the NSPI transmission system. System operators accomplish operation of the transmission system almost exclusively by using SCADA. In 1999, NSPI replaced system hardware with full graphic displays. In 1991, NSPI replaced the software that now includes a state estimator, on-line load flow capability, and a contingency analysis package.[131] NSPI scheduled this energy management software and 14 remote terminal units for replacement in 2005 with cutover completion in the spring of 2006.[132]

Newer construction of 138 kV, 230 kV, and 345 kV substations are of the ring bus[133] configuration or the breaker and a half[134] configuration. The system operator's console can display the precise configuration of each substation. Newer substation configurations can have complex configurations during outages or maintenance. SCADA permits system operators to be able to monitor power flows under all conditions.

NSPI employs three types of SCADA control on its system: full SCADA control allowing for full operator control of all equipment, two way dial up allowing for limited operator control and indication, and dial in only that allows for indication only to the operator.[135] NSPI employs redundant fiber optic communications wherever possible for use with the SCADA function.[136]

NSPI has full SCADA control of all major 345 kV, 230 kV, and 138 kV substations and of all larger generating stations including those connected to the 69 kV system. Some very small generation is not under full SCADA control.[137] All Special Protection Systems (SPSs) are under full SCADA control and continuously monitored to determine if arming status is appropriate for current system conditions.[138]

Liberty observed a system operator demonstrate SCADA system capabilities for monitoring SPS status and conditions, generation control, system limits, and system load balance. NSPI used its spare console normally used for training to accomplish this demonstration.

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[130] Usually every 30 seconds or less.
[131] A contingency analysis package is one where the computer system is continuously testing the system to hypothetical outage events.
[132] Interview of February 3, 2005.
[133] System elements are connected in a ring configuration with a breaker between each element.
[134] Two main buses are connected with rows of three breakers. Each row accommodates two system elements, thus requiring a breaker and one-half each.
[135] Response to Liberty Information request IR-54.
[136] Interview of February 3, 2005.
[137] Response to Liberty Information request IR-54.
[138] Interview of February 3, 2005.

Recommendations and Conclusions

NSPI's transmission system has adequate fault location and SCADA installation.

NSPI has a substantial portion of its transmission system monitored to locate transmission faults and monitoring locations transmit their data back to the Ragged Lake Control Centre for analysis. NSPI has installed and monitors a reasonable number of fault locating devices and that these devices are located at appropriate locations throughout the transmission system.

NSPI adequately monitors and operates its SPS systems.

NSPI has control of the backbone transmission system, major generation, and major load serving substations. Due to the radial nature and magnitude of the loads served by the radial portion of its transmission system, Liberty recommends that NSPI re-evaluate the extent and placement of line switches that are under direct control of the system operator. Additional applications of these devices could facilitate system operator restoration or disturbance isolation efforts.

SCADA system display screens are detailed and concise and operators could transfer between functions to take required actions with ease. This is a very important attribute during emergency conditions.

NSPI's SCADA system, including the installation locations, communications network, and operator interfaces, is adequate for operators to operate reliably the transmission system during both normal and contingency events.

C. November Transmission System Outage

1. Background and Analysis

One of the charters given to Liberty in this review was to explain how the failure of a few transmission system structures could result in the interruption of electric service to so many customers. This section provides Liberty's explanation.

At the peak of the November 13-14 storm, about 165,000 of NSPI's customers lost power, about 45 percent of the load that NSPI was serving at that time. For a period of 21 hours from about 7:30 pm on November 13 to 4:30 pm on November 14, 63 transmission outages occurred. Some of these outages were transient in nature and some were not. During NSPI's system restoration, seven additional transmission events occurred that hampered restoration efforts or caused further outages.[139]

Just prior to the storm, no internal transmission lines were out of service and all flows were within specified limits. NSPI considered the system to be in a normal condition. There were two 138 kV lines out of service for construction between the Springhill substation and New

[139] Interview of February 2, 2005.

Brunswick. The system maintained transfers between NSPI and New Brunswick at appropriate low levels to cover for the potential loss of the single remaining 345 kV tie line to New Brunswick. During the event, NSPI closed the two 138 kV circuits to New Brunswick and as a matter of procedure reduced transfer levels below the levels that would activate Special Protection Systems. These actions placed the system in a more secure state.[140]

Customers may lose electric service in three ways during a major storm event. First, a disturbance or fault on the transmission system can cause the power loss. These outages typically cause a large number of customer interruptions because transmission facilities serve large geographic areas of the system. However, transmission system outages generally have a shorter duration because of the priority given in the restoration process and the fact that operators can often remotely control transmission facilities. Second, a disturbance or fault on the distribution system can interrupt service to customers. These outages generally involve a smaller number of customers. However, a storm can easily cause many more outages on the distribution system and restoration often involves the dispatch of personnel to the location of the outage increasing the outage duration. Finally, direct operator action can interrupt service to customers. There can be situations in which operators intentionally interrupt customers to maintain system load and generation balance or maintain adequate voltages on the system.[141]

This section provides the results of Liberty's review of how transmission system outages, transmission structure failures, and restoration of transmission lines affected the number of customers without service during the November event. As an illustrative example, a radial transmission line may trip interrupting service to 10,000 customers. Three hours later, operators restore the transmission line but only 6,000 customers have service restored. The remaining 4,000 customers continue to have service interrupted because of several outage events on the distribution system that occurred subsequent to the original transmission outage.

Liberty addresses the transmission system outages on an operating region basis and only addresses those faults that were permanent in nature only. Any discussion of the many temporary faults that occurred tends to complicate understanding of the event and its effect on the number of customer interruptions. NSPI has six operating areas and four regions. The table below shows their relationship and the approximate customer count for each.

NSPI Operating Areas and Regions with Customer Count

Operating Area(s)	Operating Region	Number of Customers
Canseau and Northern	Northeastern	94,000
Halifax	Metro	172,000
Valley and Western	Western	125,000
Sydney	Sydney	54,000

[140] Interview of February 2, 2005.

[141] The Northeast Power Coordinating Council requires such action during emergency conditions to preserve the interconnection.

Northeastern Operating Region

November 14, 2004

By 04:39, distribution outages had interrupted 19,000 customers in this region.

04:39 – L-5522, 69 kV line radial from Trenton to Walker Street trips and locks out. Approximately 7,000 customers interrupted due to transmission.

05:57 – L-6503 (1 structure fails), 138 kV line from Onslow to Trenton. 20 MW of load is lost at the Michelon-Grayton plant. The first 138 kV path to Trenton has opened.

07:24 – L-8004, 345 kV line from Hopewell and Woodbine trips and locks out. No load is lost but the 345/138 kV transformer at Hopewell feeding two 138 kV circuits to Trenton is left on a single feed. (This is the first transmission tie to Cape Breton to lock out. See Sydney Region below.)

09:00 – L-5501/5510, 69 kV line from Trenton to Malay Falls trips and locks out. Approximately 7,000 customers interrupted due to transmission. (14,000 total)

09:41 – L-6515, 138 kV line from Port Hastings to Lochaber Road trips and locks out. Little loss of load, but the second 138 kV path to Trenton has opened. (This is the third transmission path to Cape Breton to lock out. See Sydney Region below.)

14:05 – L-8003, 345 kV line from Hopewell to Onslow trips and locks out. This outage causes the last two remaining 138 kV circuits to Trenton to trip. The generating plant trips and interrupts approximately 17,000 customers due to transmission. (31,000 total) This coincides with the time of peak NSPI customer outages.

15:26 – L-6515, 138 kV line from Port Hastings to Lochaber Road is restored. Approximately 11,000 customers restored.

Out of the 94,000 customers in the Northeastern Region, approximately 48,000 customers were interrupted. Of these, 31,000 were due to transmission faults with 11,000 quickly restored. When L-6515 was restored on November 14, 2004 at 15:26, transmission in the Northeastern Region was able to pick up distribution loads as distribution problems were fixed.

Overall, the outages in this region were a mixed transmission and distribution event.

Sydney Operating Region

November 14, 2004

By 07:24, distribution outages had interrupted little or no customers in this region.

07:24 – L-8004, 345 kV line from Hopewell and Woodbine trips and locks out. No load is lost but this is the first transmission tie to Cape Breton to lock out.

08:04 – L-7005, 230 kV line from Onslow to Port Hastings trips and locks out. No load lost.

09:41 – L-6515, 138 kV line from Port Hastings to Lochaber Road trips and locks out. Little loss of load but this is the third transmission path to Cape Breton to lock out.

Out of the 54,000 customers in the Sydney Region, the storm interrupted few if any customers from either distribution or transmission causes. Transmission in the Sydney Region remained ready to pick up distribution loads if distribution problems arose throughout the entire event.

Metro Operating Region

November 13, 2004

By 22:26, distribution outages had interrupted 6,000 customers in this region.

22:26 – 103H-T61, 138/25 kV transformer at Lakeside is lost interrupting approximately 7,000 customers due to transmission.

23:46 – 103H-T61, 138/25 kV transformer at Lakeside is restored. Approximately 4,000 customers restored. (7,000 total)

November 14, 2004

01:46 – L-6003 (5 structures fail at approximately 03:00 after the loss of L-6007), 138 kV line from Sackville to Tuft's Cove trips and locks out. Three distribution circuits tripped. Approximately 7,000 customers interrupted due to transmission. (14,000 total)

02:49 – L-6002 (6 structures fail), 138 kV line from Sackville to Westhaver's Elbow trips and locks out. Approximately 12,000 customers interrupted due to transmission. (26,000 total)

05:55 – L-8001, 345 kV line from Onslow to Memramcook (NB Power) trips and locks out. This outage causes the separation of Nova Scotia and New Brunswick. In addition, a faulty circuit board sent an incorrect signal to the Special Protection System associated with this line that tripped a unit at Lingan. Intentional operator action interrupted 18,000 customers for frequency control. (44,000 total) Shortly thereafter, the transmission operator restores 16,000 customers.

Out of the 172,000 customers in the Metro Region, 67,000 customers were interrupted. Of these, 44,000 interrupted customers were due to transmission faults with 20,000 quickly restored. Transmission in the Metro Region remained ready to pick up distribution loads if distribution problems arose throughout the entire event.

The outages in this region were primarily a distribution event because of outage durations and the ability of transmission to pick up load..

Western Operating Region

November 14, 2004

By 02:49, distribution outages had interrupted 15,000 customers in this region.

02:49 – L-6004 (14 structures fail), 138 kV line from Sackville to Canaan Road trips and locks out. Approximately 4,000 customers are interrupted due to transmission. This is the first transmission line to the valley to be lost.

05:32 – L-6012, 138 kV line from Brushy Hill to Canaan Road trips and locks out. Little load is lost. This is the second transmission line to the valley to be lost.

06:01 – L-5016, 69 kV line from Five Points to Saint Croix trips and locks out. Approximately 27,000 customers are outages due to transmission. (31,000 total) This is the third transmission line to the valley to be lost.

06:53 – L-5535, 69 kV line from Sissiboo to Tusket trips and locks out. Little load is lost. This is the fourth transmission line to the valley to be lost.

13:17 – L-5532, 69 kV line from Big Falls to Gulch trips and locks out. Approximately 15,000 customers are interrupted due to transmission. (46,000 total) This is the fifth and last transmission line to the valley. The Annapolis Valley area is now totally without service.

November 15, 2004

14:57 – L-6012, 138 kV line from Brushy Hill and Canaan is restored.

Out of the 125,000 customers in the Western Region, approximately 66,000 customers were interrupted. Of these, 46,000 customers were due to transmission faults. When L-6012 was restored on November 15, 2004 at 14:57, transmission in the Western Region was able to pick up distribution loads as distribution problems were fixed.

The outages in this region were primarily a transmission event.

Total System

Out of the 445,000 customers in the NSPI service territory, approximately 181,000 customers lost service. Transmission faults caused 121,000 of those customer interruptions, with 31,000 quickly restored, and with 23,000 caused by transmission structure failures. In two regions, transmission was able to pick up distribution load throughout the event. In the third region, transmission was able to pick up distribution load within approximately 19 hours after the storm's inception. In the fourth region, transmission was able to pick up distribution load within approximately 43 hours after the storm's inception. The outages across the system were a mixed transmission and distribution event.

2. Conclusions and Recommendations

The failure of transmission structures caused only about 13 percent of the customer interruptions during the November storm.

The November storm caused approximately 181,000 non-coincident customer interruptions. The outage durations were a mixed transmission and distribution event. On an operating region basis, the outages associated with the November storm and their duration were:

- Predominantly a mixed transmission and distribution event in the Northeastern Operating Region
- A non-event in the Sydney Operating Region
- A distribution event in the Metro Operating Region
- A transmission event in the Western Operating Region.

The failure of the 26 transmission structures caused the loss of power to only 23,000 of the total 181,000 customers affected.

Interview References

Liberty's footnoted interview references in Section III of this report relate to the following interviews with NSPI personnel:

February 2, 2005
November Storm and NSPI Transmission System Overview

- Senior Specialist, System Planning

Load Forecasting

- Load Forecaster
- Specialist, Operations Planning

Ratings and System Planning Models

- Director, T&D Assets
- Senior Specialist, System Planning
- Specialist, Operations planning
- Specialist, System planning

February 3, 2005
NSPI Control Centre, Operating Procedures, SCADA System

- Quality manager
- Specialist, Operations planning
- Software Specialist

Storm Response

- Director, Control Centre Operation

Relaying
- Senior Protection Engineer

Right-of-Way Widths and Maintenance
- Manager, Vegetation management

System Planning Criteria
- Director, T&D Assets
- Senior Specialist, System Planning
- Specialist, Operations planning
- Specialist, System planning

February 6, 2005
Aerial Inspections
- Manager, Inspections

February 15, 2005
System Design Studies
- Senior Specialist, System Planning

Energy Control Centre Action During the Storm
- System Control Supervisor

Outage Chronology
- Specialist, System Planning

February 16, 2005
System Operating Limits and Guides
- Specialist, Operations planning

IV. Communications and Outage Response

A. Call Center

1. Background

The Board asked Liberty to review the sizing and operation of NSPI's customer call center and its routine customer service and emergency response. This included review of the physical setup of the NSPI call center as well as staffing during normal and peak calling periods.

The majority of mainland Nova Scotia felt the effect of the November storm. Many customers lost power in the early hours of November 14, resulting in unusually high call volumes to NSPI's Power Outage Line and general Customer Service Line. The highest one-hour period of call traffic during the storm occurred between 8 am and 9 am on Sunday, November 14, when customers presented 43,639 calls to NSPI. However, NSPI experienced unusually high calling traffic throughout the day on Sunday November 14 and for the following several days.

It was extremely difficult to communicate with NSPI during the storm, especially on Sunday, November 14. NSPI's Power Outline Line or Customer Service Line received more than 300,000 calls on Sunday. Of those, only 2.5 percent of callers (7,585) reached a "live person." Even worse, the majority of callers (71 percent on Sunday) were disconnected, with and without any warning, due to technology design capacity limitations. Additionally, various technology failures inhibited call flow and corrupted the information delivered to callers. NSPI instituted patches and "work-arounds" to deal with some of the problems, however the damage was done to the caller "experience" and customer satisfaction. In addition, the timing and limitations in the level of detail provided about the storm and restoration progress frustrated customers, the media, emergency and public safety coordinators, and government officials.

2. Analysis and Conclusions

NSPI experienced significant failure in its Call Center telephony during the November storm.[142]

NSPI had significant technology issues and failures during the November storm, most related to the challenges and stresses endured while attempting to respond to the high volume of calls received on Sunday, November 14. The four major technology failures were:

- HVCA and IVR Delivered Garbled Outage Messages to Callers
- HVCA Disconnected Callers due to Capacity Limitations
- Call Center Network Unavailable Due to Power Interruptions
- IVR Operating Very Slowly While Agents Sitting Idle

[142] Response to Information Request IR-88, interviews with NSPI personnel, documents provided during interviews.

At the beginning of the November storm, the High Volume Call Answering (HVCA) and Interactive Voice Response (IVR) delivered garbled outage messages to callers. For a period of 11 hours, NSPI experienced difficulties recording the messages that callers would hear when the HVCA first answered their calls. As early as 7 pm on Saturday, NSPI call center staff's attempts at recording customized messages failed. The garbling took place during the recording and uploading process to the IVR and HVCA. At 6 am on Sunday morning, NSPI put a work-around in place to enable proper recording and uploading of customized messages. Unfortunately, any of the 25,000 or so calls to the Power Outage line from 7 pm on Saturday through 6 am on Sunday could have heard garbled or nonsense messages. Obviously, delivering garbled messages about this extensive power outage did not facilitate communications between NSPI and the public. In addition, this undoubtedly increased the number of repeat calls to the Power Outage line and further compounded problems.

The HVCA disconnected callers and failed to deliver outage messages due to capacity limitations. Early Sunday morning, NSPI noticed that the HVCA began disconnecting callers with and without any notice. As early as 5 am on Sunday, the extremely high volume of inbound calls began to exceed the capacity of the HVCA on several levels. Because of a capacity limitation, many callers were not hearing the message about the storm, which, as of 6 am on Sunday morning, was the following:

> *We are currently experiencing power outages in your area due to high winds, wet snow, and falling trees. Crews are assessing the damage. We are unable to provide you with a restoration time until the storm passes. If you are calling to report an emergency situation such as a wire down, please stay on the line.*

Due to capacity restrictions in the design of the HVCA, 28 percent of all callers to the Power Outage line on Sunday did not receive this message (64,422 callers). Callers in the more populated affected areas—Halifax, Sackville, and Wolfville—were most likely to not receive the message.

The system disconnected some callers politely, informing them that the Power Outage line was experiencing a high volume of callers, asking them to call back at a later time. This happened to 27 percent of the calls presented on Sunday. However, the system disconnected other callers with no warning or message. This happened to 100,067 callers, or 44 percent of all calls presented, on Sunday. In total, the system disconnected 71 percent of the calls into the Power Outage Line on Sunday due to HVCA design capacity limitations. Because of call reporting limitations, NSPI was unable to indicate how many of these callers received the power outage message before disconnection.

NSPI's Call Center computer network was unavailable for several hours on Sunday due to power interruptions. The Call Center experienced several "power bumps" between midnight and 3 am on Sunday. The last loss of power caused all network connections to be lost as of 3 am. For the next five hours, NSPI made various efforts to reset switches and restart the network. Ultimately, it had to fix the air conditioning in the room housing the network before the network could operate correctly. As a result, the call center network was effectively down for five hours, making it impossible for call center agents to use their supporting information systems to

respond to customer inquiries, to accept customer outage reports, or even pull up a customer account. NSPI directed agents to capture all "wires down" or emergency calls on paper and fax them to the Regions. Agents had to manually record all other outage reports on paper for later entering in the Outage Management System (OMS). This delayed the analysis of the extent and location of the outages. It also hindered NSPI's call center response to customers.

At noon on Sunday, call center personnel started noticing long processing times in the IVR while many agents were sitting idle. After investigating this issue, it was determined that a glitch in the IVR programming software was causing long delays or pauses in between menu prompts, scripts, and announcements. Completing a transaction in the IVR, either to hear outage information or to report an outage, was taking much longer than normal, causing calls to back up in the queue into the IVR. Meanwhile, many agents were sitting idle waiting to take a call.

Within four or five hours, NSPI successfully executed a bypass around the IVR. Basically, starting at about 5 pm on Sunday, November 14, through the duration of the outage on Friday, November 19th, when agents were available, NSPI routed calls directly to the agent queue, bypassing the IVR and its self-service options. At least 19,000 calls bypassed the IVR during the week. While calls were bypassing the IVR, NSPI's technology support teams were working on patches to the IVR software. They executed a temporary fix to the slow response issue at 3 pm on Monday, November 15.

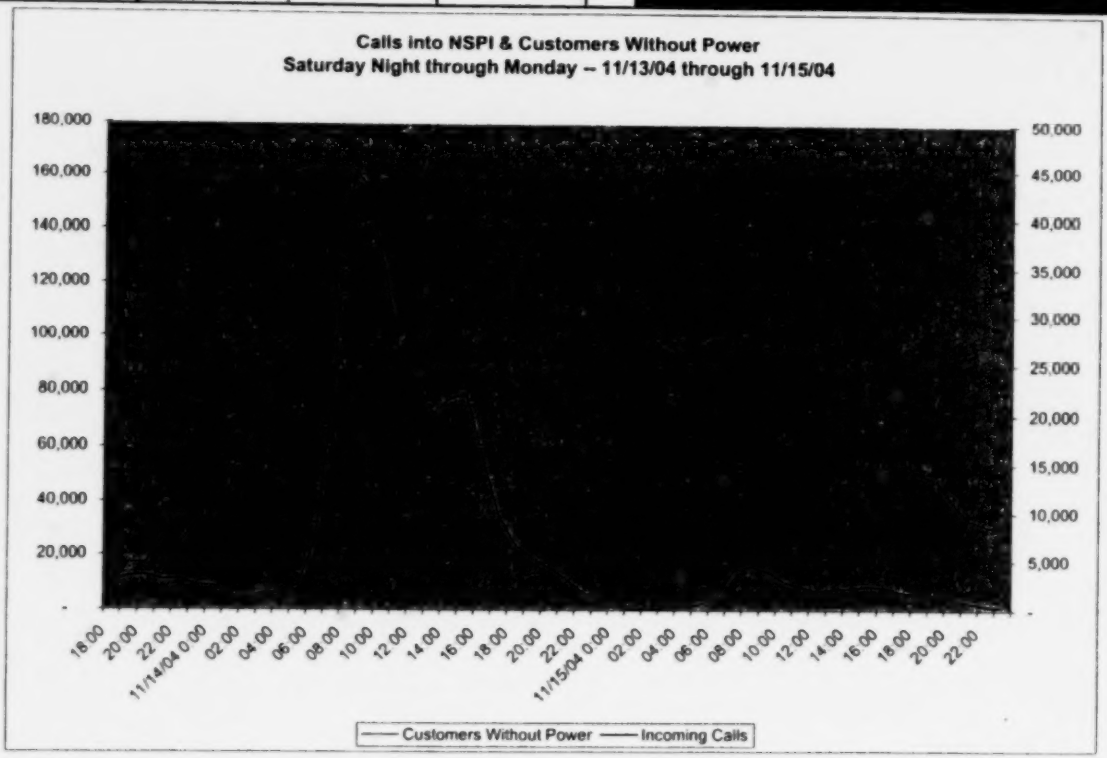
NSPI had implemented its new IVR technology in August 2004, in combination with a new suite of Call Center applications intended to route calls to the best available agent based on predefined skill sets (skills-based call routing). The combination of the software glitch that slowed the interactive response from the IVR and the heavy call volume caused calls to pile up in queue. Agents were sitting idle, even with a full queue, because of poor design in the initial set-up of the skill-based routing. Unfortunately, these issues were not uncovered during the acceptance testing of the new system in August.

As a result of these problems, many customers wishing to hold on the line to report an outage through the IVR or talk to an agent experienced extremely long hold times. Many callers abandoned the queue—19 percent of callers abandoned on Sunday—before speaking with an agent. Thirty-five percent of callers presented to the IVR hung up or abandoned the IVR at some point. It is difficult to determine if these callers accomplished their mission or gave up trying. Additionally, due to this pile-up of calls waiting to get through the IVR, the HVCA dropped calls due to capacity limitations of the HVCA wait queue.

A summary of the effect of technology failures is included as an exhibit on the following page. The timeline shows the effect on the caller and the timing for each failure. An overlay chart shows the call volumes from late Saturday night through Monday evening.

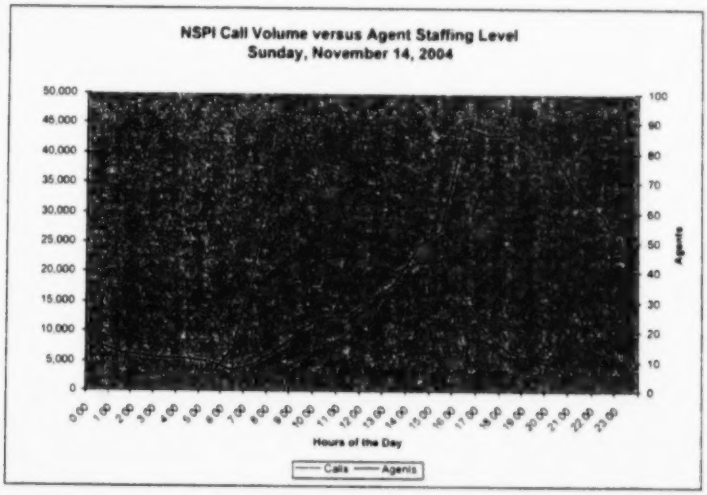
Effect of Call Center Technology Failures

Technology Failure	Saturday	Sunday - November 14, 2004	Monday - November 15, 2004
	18 19 20 21 22 23	0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23	0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23
Garbled Messages			
Network Unavailable			
Disconnected			
Slow IVR			
IVR Bypassed			



The NSPI Call Center was unable to ramp up staffing as quickly as needed to respond to customer calls.[143]

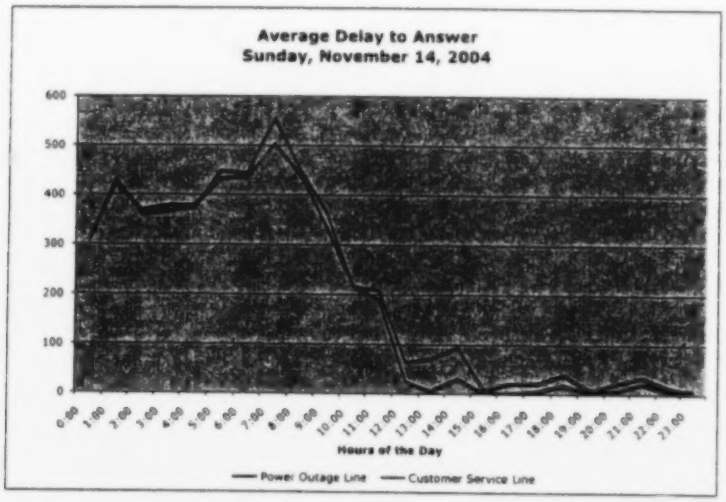
The storm unexpectedly escalated into a Level 3 event early Sunday morning. NSPI opened the Storm Call Center at 6 am on Sunday. At that time, approximately 100,000 customers were without power. Staffing levels were at their lowest at 6 am on Sunday. While management began calling agents to the center, storm conditions made it difficult for them to get there. As a result, the peak calling period occurred at a time of minimal staffing in the center, as seen from the chart below.[144]



On Sunday, staffing peaked at 4 pm. NSPI continued to staff the center throughout Sunday and Monday with NSPI call center agents and other qualified NSPI employees. In addition, NSPI arranged third-party call center services with Aliant, adding agents from Aliant's Newfoundland Call Center as early as 4 pm on Sunday afternoon and continuing through Tuesday.

Because NSPI was unable to ramp up staffing quickly, customers calling the Power Outage and Customer Service line experienced extremely long wait times as well as high abandonment. The following chart shows the average wait times (delay to answer in seconds) for Sunday.[145]

[143] Response to Information Request IR-88, interviews with NSPI personnel, documents provided during interviews.
[144] Response to Information Request IR-88, interviews with NSPI personnel, documents provided during interviews.
[145] Response to Information Request IR-88, interviews with NSPI personnel, documents provided during interviews.



Third-Party agents had no access to NSPI systems.

Through a contract with Aliant, NSPI redirected calls from the HVCA hold queue to one of Aliant's call centers in Newfoundland. According to NSPI Call Center management, agents answered calls from a confined geographic area, making it easier to control the information flow to agents necessary to support calls. Before handling calls, NSPI management provided orientation and outage call handling training to supervisors at Aliant's Newfoundland center, who in turn trained Aliant agents. NSPI also monitored Aliant's performance while handling calls.

However, the agents in Aliant's call center had no access to NSPI information systems. NSPI faxed status sheets to Aliant to use when communicating with customers and asked them to manually record outage reports on paper report forms. Aliant then faxed the forms back to the NSPI call center in Halifax for keying into the Outage Call Entry (OCE) component of OMS.

While third-party agents were able to answer incoming calls, reducing customer wait time, they were unable to access account information, verify addresses, or enter outage reports into the Outage Call Entry System (OCE) in OMS. This delayed the entry and analysis of outage information, as they had to fax the hard-copy outage tickets to the Halifax call center and entered later. Additionally, third-party agents were unable to confirm to customers calling back to make sure that NSPI had noted their outage.

Due to heavy call volumes and staffing constraints, e-mail response was inconsistent.[146]

Normally, a group of agents in the NSPI center is responsible for responding to customer e-mail inquiries. During the storm, these agents handled incoming calls. As a result, NSPI began a

[146] Interviews conducted on various dates.

process of scanning incoming e-mail to quickly route out and respond to any "critical" e-mail messages. It backlogged other e-mail, not deemed to be of an emergency nature, until sufficient resources were available to respond.

During the week of the storm and even the week following, NSPI received two to three times as many e-mail messages as normal. Customers were contacting the company to report emergency situations, report the outage, inquire about restoration status, complain about the outage, send appreciation for work during the outage, as well as trying to conduct "normal business" related inquiries. During the storm, 60 percent of e-mail related to the outage, where normally, NSPI sees 1 to 2 percent of e-mail relating to outages.

While it appears that NSPI adequately managed emergency and critical e-mail, it delayed answering the bulk of the incoming e-mail until a later time. This effectively rendered e-mail useless as a communications avenue for customers, even though NSPI's web site promoted its "Talk to Us" service and promised 48-hour response, in the manner selected by the customer (e-mail, phone, fax, postal service).

Additionally, there were no updates to the web site during the storm to tell customers not to rely on e-mail or the "Talk to Us" as a form of communication, and no change to the promised to response with 48 hours. Additionally, the e-mail form on the "Talk to Us" page welcomed visitors to call the company—through the general Customer Service telephone number (no Power Outage number listed on this page). While this makes sense during normal business, it was not the appropriate phone number to list during the outage, especially since the Customer Service Line cannot handle a high volume and as a result was delivering "busy" signals during much of the storm.

NSPI had no predefined process for handling e-mail during a Level 3 or 4 event. As a result, the "solution" chosen was impromptu. It had nothing set in place to ensure proper response to customers within any predefined timeframe.

The NSPI Call Center response was inadequate. NSPI was unable to respond to the majority of its customers that called the company during the November storm.

Customers attempting to contact the NSPI Outage Line or Customer Service Line could have experienced the following:

1. Could not reach the NSPI Customer Service Line or Power Outage Line. They may have received a busy signal when trying to call NSPI's Customer Service Line. They may have received no dial tone or fast busy signals while trying to dial into NSPI Power Outage or Customer Service Lines.

2. Reached the Power Outage Line and experienced one or several of the following:
   - Heard a garbled message concerning the storm

- Heard a message concerning the storm and told to remain on the line to "report an emergency situation"
- Got disconnected without hearing any message about the storm
- Got disconnected after hearing the message about the storm, while wishing to remain on hold to report an emergency situation
- Told to call back at a later time and disconnected
- May or may not have heard the storm message; also heard ringing or busy signal.

3. Reached the Interactive Voice Response (IVR) and experienced:
   - An excessively long wait time to the IVR's automated service to hear status on outage in caller's area and to report the outage
   - The inability to report an outage through the IVR's automated service—incoming phone number did not match NSPI's database and customer was not able to enter account number when prompted in outage reporting application
   - Experienced long pauses or delay in between messages and prompts.

4. Got to a "live person" and experienced:
   - An excessively long wait time to an agent—the average wait time was 8 to 10 minutes at peak
   - An excessively long wait time to a third-party agent who had no ability to reference customer account information and a limited ability to relay status about the outage or restoration efforts
   - An excessively long wait time to a company agent who had no ability to reference customer account information and a limited ability to relay status about the outage or restoration efforts.

5. Hung up while waiting
   - Caller terminates or abandons call at any point before reaching agent.

Outage information delivered in the November storm did not satisfy callers. Because of the size of the outage and the large number of customers that lost power simultaneously, NSPI received a flood of calls. The HVCA system, at the time, could only deliver a message to 30 simultaneous callers within an area, such as Halifax. All others went into overflow, causing unexpected disconnection or polite disconnection. Callers lucky enough to make it into the IVR queue overflowed the IVR, causing several problems, including a delay in responsiveness of the IVR prompts and menu options and agents sitting idle while callers were locked up in the IVR. Not only did callers not get an appropriate message delivering expected restoration times, they were unable to report that their power was out—the top two reasons that customers call the company in the first place.

During the November storm (all days):[147]

[147] Response to Information Request IR-88, interviews with NSPI personnel, documents provided during interviews.

- 18 percent of all callers did not receive the HVCA message due to telephony capacity restraints
- 17 percent of all callers were "politely disconnected" from the HVCA
- 27 percent of all callers were disconnected without any warning or message
- 20 percent of callers abandoned while waiting for an agent
- 10 percent actually ended up speaking with a live person.

The Boxing Day storm was slightly more successful:

- Very few (49 callers) did not receive the HVCA message (of 55,173 total HVCA calls)
- 6 percent were disconnected by the HVCA without any message or warning
- 29 percent of callers abandoned while waiting to speak with an agent
- 15 percent of total callers ended up speaking with a live person.

Politely disconnecting ("we're too busy, call back at a later time") is effectively no better than presenting a busy signal. Some might argue it is actually worse. By accepting the call initially, you build the expectation that the caller has gotten through to the company. A busy signal lets the callers surmise that you are too busy. In either case, the caller cannot resolve their issue and must call back to attempt resolution, or give up. Disconnecting without any warning or message is inexcusable and just plain poor customer service.

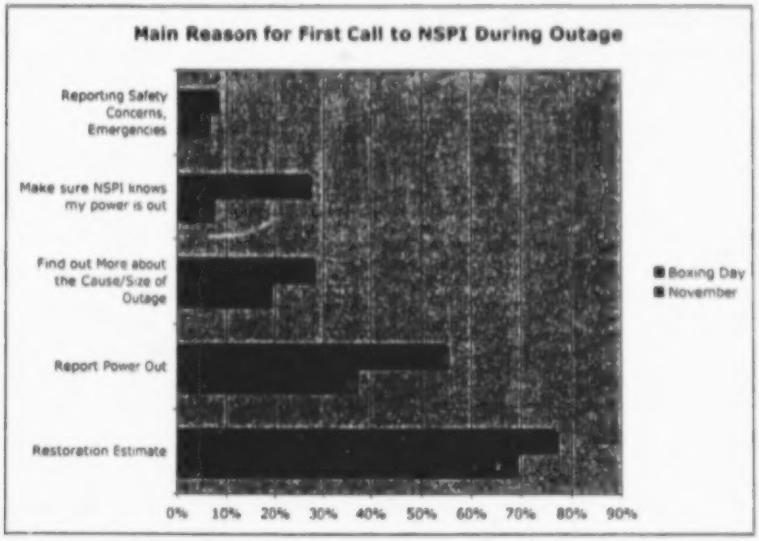
NSPI's HVCA design cannot guarantee it will not disconnect callers, whether politely or impolitely. It also cannot guarantee the same level of service to all callers. More callers from one area at the same time increase the probability that the system will deliver different levels of service. When many customers are calling from many areas at the same time, the entire system will become overloaded.

For a system that should deliver high volume call answering, there is no guarantee that it will work adequately under high volumes, much less deliver the desired level of service that customers expect. Because it does not have the capacity to interact with individual callers, nor deliver an individual "message," it forces the callers to accept a more generic message, or a regional message, as their information. The fact that customers have to wait to report an outage effectively acts as a disincentive to report the emergency or outage or causes caller dissatisfaction.

While the HVCA might work well in smaller outages that affect fewer customers, it does not work effectively, nor deliver an adequate level of service during a large outage, such as the Boxing Day or the November storm. Moreover, its poor performance has exacerbated public opinion about NSPI and its ability to respond appropriately to large power outages.

To make matters worse, during the November storm, management chose not to provide estimated restoration information to callers or the public until "damage assessment" was complete (not until Tuesday morning). Regardless of the difficulties in getting out into the affected areas to assess the damage, customers without power since Saturday, could not get any idea from the company how long they would be without power, for at least two days. This was

frustrating to customers and the public, causing abnormally heavy call volume into the Power Outage and Customer Service Lines through Tuesday. Aside from the fact that customers could not get through to NSPI, post storm customer research confirms that the next two biggest reasons for dissatisfaction, as shown on the chart below, were that the company was unable to tell customers when the power would be restored and that callers could not get any or enough information about the outage.[148]



Callers wishing to report an emergency situation, such as a downed line or fire, have no special priority in the HVCA.

Under the current HVCA configuration, callers wishing to inform NSPI of an emergency situation or safety concern have no special priority over other callers. As such, these emergency calls are subject to the HVCA capacity limitations and the system could disconnect them or hold them in queue for several minutes. During the November storm, NSPI asked callers to remain on the line in the case of an emergency, yet NSPI failed to define "emergency" so it was still difficult for many callers to get through, even the emergencies. This is an unacceptable solution for emergency calls.

NSPI's customers experienced similar problems during the Boxing Day storm.[149]

During the Boxing Day storm, NSPI had made a few changes to its technology and its communications strategy. The Boxing Day storm was not as big in terms of affected customers and duration and, as a result, there were not as many calls into NSPI (an average of 32,500 per

[148] Response to Information Request IR-90, interviews with NSPI personnel, documents provided during interviews.
[149] Responses to Information Requests IR-88, IR-89, and IR-92, interviews with NSPI personnel, documents provided during interviews.

day for two days compared to 411,000 in November over seven days, an average of 58,700 per day). However, the HVCA system again experienced capacity problems and delivered an inconsistent level of service to callers. However, the system provided more detailed messaging.

Management made a concentrated effort to post "Early ETRs" in affected areas, so customers could get some idea of the effect of the outage within the first 24 hours. While "getting into the power outage line" and lack of restoration information were the two biggest areas of dissatisfaction in the November storm, this shifted to "couldn't get any or enough information" and difficulty in "getting into the power outage line" as the two biggest areas of dissatisfaction in the Boxing Day storm. Clearly, more callers got through, and more callers got some restoration information, than in November, but still not adequately enough to improve satisfaction.

It is likely that some of NSPI's customers will continue to experience difficulties during another large or concentrated outage.[150]

After its reconfiguration in January, the HVCA system will now deliver a "message" to 255 simultaneous callers within a certain geographic area, Halifax for instance. More than 255 simultaneous callers in any one of 31 predefined geographic areas will cause the system to go into overflow, with the excess callers not getting to hear the "message" but still having a chance of getting into one of 320 spots in a queue that funnels into 94 trunks that feed into 44 ports in the IVR. Also competing for these 94 trunks are calls arriving into NSPI's Customer Service Line. When these 94 trunks are full, callers to the Customer Service Line will receive a "busy" signal. While the HVCA theoretically can accept 7,905 simultaneous callers, those calls must be equally distributed throughout NSPI's 31 service areas. When the 255 slots in a specific area are full, additional calls from that area cannot spill over into the other 30 x 255 slots, even if they are not being used at all. Instead, all overflow goes into a three-stage loop that attempts to place the overflow callers in a queue before the system has to disconnect the caller. If at any point, there is no more waiting room in any of the stages, the call must be terminated. Additionally, if the system has more than 255 callers in any stage that it cannot place in a queue, it will terminate the call without any message.

Callers waiting in the HVCA for a queue have about two minutes of wait time (music on hold) before the system asks if they want to continue holding. If there is room to put the caller back into the hold queue, the system will as long as the caller keeps confirming they want to hold every 60 seconds. If there is no room, the caller gets a busy signal and is released. So when calls start to back up, waiting for an agent or as callers are using the IVR to obtain status updates or report the outage, the available queue spaces fill up and more and more callers just coming into the HVCA and hearing the message will be disconnected, either politely or impolitely.

NSPI must be able to accommodate the large influx of calls during a large outage. The HVCA system does not satisfy their customers' basic needs. If NSPI can develop and deliver a "timely and accurate" message of expected restoration and size/cause of storm, NSPI still cannot accommodate the 55 percent of callers (NSPI Customer Research finding) that still want to

[150] Responses to Information Requests IR-88 and IR-89, interviews with NSPI personnel, documents provided during interviews.

report the outage. Even more important, the 6 to 8 percent (NSPI Customer Research finding) calling to report a safety issue or emergency, such as a downed line or fire, cannot get through to the IVR or the call center agents because they are waiting, along with other customers who would like to report their outage.

As configured, the HVCA is also not interactive. As a result, callers have to wait in queue to get to the IVR or the call center agent. There are 94 lines into the IVR and the call center. This means that once callers receive the "message" at the HVCA level, they then have to hope they get into the queue for the IVR or the call center without disconnection by the HVCA, and then be subject potentially to long wait times in the queue.

NSPI's Call Center is appropriately sized and managed to deliver adequate customer service during normal business hours.[151]

NSPI's current call center supports up to 100 agents. NSPI has an additional 12 seats available in its Training Center in the same building that can supplement call handling as needed. During normal business, NSPI operates its call center from 8 am through 8 pm Monday through Friday and from 9 am through 5 pm on Saturday. During these business hours, call center representatives handle customer calls relating to service, billing, and collections, including calls to report power interruptions. After hours, a skeleton crew of up to six agents handles calls in the Dispatch Center. The IVR informs callers that after-hours business can be conducted in a self-service mode and routes all emergency calls an agent.

NSPI has also established a 12-seat contingency call center at the Control Center that it can activate on short notice. This center was not utilized in the November or Boxing Day storms.

NSPI uses a combination of full-time and part-time employees to staff its call center during business hours. Management forecasts staffing levels to fit projected workload derived from historical call volumes, known events, and seasonal variations. NSPI has established service level goals for responding to types of incoming calls, as follows:

- Residential Customer Service – answer 70 percent of calls within 20 seconds
- Business Customer Service – answer 70 percent of calls within 20 seconds
- Collection-related Calls – answer 60 percent of calls within 20 seconds
- Outage-related Calls – answer 50 percent of calls within 120 seconds
- Wiring Permits – answer 70 percent of calls within 20 seconds

On the basis of these service levels, management determines the number of employees that it needs to handle projected call volumes. This is a common call center staffing approach used by other utilities and other industries. NSPI's service level goals are consistent with other utilities.

On the basis of NSPI's seat capacity, its average call handle time (6 minutes), its service level goals, and agent availability, NSPI should be able to handle from 750 to 850 calls per hour at

[151] Responses to Information Requests IR-88 and IR-89, interviews with NSPI personnel, documents provided during interviews.

maximum staffing (during normal business hours). With an average delay to answer of 48 seconds, NSPI's call center is handling calls such that customers wait on average about 48 seconds in queue to speak with an agent. NSPI's trunking can deliver up to 1,100 or so calls per hour, based on the above handle time and service levels. NSPI's physical call center is adequately sized to handle day-to-day call volumes. Call volumes exceeding these levels will increase the wait times in queue, reduce service level, and increase abandons.

NSPI should continually review its call volumes, handle times, and service level performance to ensure the call center is adequately sized (trunks, seats) to deliver responsive service.

In addition, NSPI has created a staffing model that facilitates call center response during the varying levels of an event, such as a large scale outage. The model provides guidelines for adding resources, based on the predicted severity of the event, projected call volumes, the timing, and expected duration,

> **Considering the technology and communications failures experienced early during the November storm, NSPI's Call Center was not initially staffed to handle the volume of callers wanting to hold on the line for an agent.**[152]

Calls in queue for the IVR or a live person hovered between 1,000 and 1,400 an hour from midnight on Saturday through 9 am on Sunday. These were callers who had made it through the HVCA, opting to remain on the line to report an outage or speak with an agent. Again, the messages at that time may have been garbled in the HVCA and even then, the message was general, indicating an outage and suggesting that callers hold on the line to report the outage or emergency situation.

If NSPI had been at maximum staffing (100 seats), based on the outage service level of handling 50 percent of calls in 120 seconds, and an average handle time of 4 minutes (for outage calls), this volume of calls should have been manageable, *i.e.* with a wait time of less than two or three minutes. However, because call traffic began growing at midnight, on a weekend night, NSPI was operating with minimal staffing—from 7 to 21 during this period.

Calls into the IVR/agent queue started peaking at 2,000 to 2,800 calls per hour from 11 am through 6 pm on Sunday. Staffing levels at this time grew slowly from 25 agents at 11 am to 86 agents at 6 pm. At the maximum staffing of the day (89 agents at 4 pm), the center was handling about 600 calls per hour. Staffing was still below maximum seating and Aliant's third-party center was supplying 38 of the 89 agents. NSPI was only able to seat 54 of its own employees on Sunday, and that did not happen until 3 pm, before Aliant was brought on board. By Monday morning at 9 am, NSPI had increased staffing to a total of 97 agents (82 NSPI and 15 Aliant). Throughout Monday, NSPI continued to add staff to a max of 119 agents (98 NSPI and 21 Aliant). As a result, the average wait time dropped to under a minute.

[152] Responses to Information Requests IR-88 and IR-89, interviews with NSPI personnel, documents provided during interviews..

As discussed in an earlier finding, NSPI was slow to ramp up staffing on Sunday, primarily due to difficulties in getting employees to the center due to deteriorating storm conditions. Had NSPI been able to ramp up more quickly, or had call center staff been staged in a nearby hotel, as NSPI was able to do in the January storm, more calls would have been handled, fewer callers would have abandoned while waiting, and wait times would have been much shorter.

NSPI's overall call center performance is average as compared to other electric utilities.

Liberty compared NSPI's call center performance against the Ascent Group's database of call center performance. The Ascent Group has been measuring call center performance within the utility industry for more than 15 years and offers online benchmarking services to utilities. Liberty compared NSPI's overall 2004 call center performance with other electric utilities. More than 145 utilities participate in the call center benchmarking, including more than 50 electric utilities.

Overall, NSPI 2004 call center benchmark performance is average—second or third quartile performance in all call center benchmark metrics analyzed. NSPI performance was benchmarked against the electric utility industry and the overall utility industry (electric, combination, gas, water).

NSPI experiences low agent turnover in its call center, at levels below the industry. This is a leading indicator for overall customer service performance. The lower the turnover, the more stability and experience in the call center agent group. Lower turnover usually indicates high employee satisfaction that, in turn, contributes to high customer satisfaction.

NSPI receives approximately 1.9 to 2 million calls per year. This equates to about 4.3 calls per customer per year. This is on the high side, as the Ascent Group's industry average, for electric utilities, is 1.9 calls per customer per year. The Canadian Electric Association also indicated this finding in a 2001 benchmarking study of Canadian Electric Utilities—NSPI was 15 out of 16 in terms of calls per customer. There are many possible explanations for a high call per customer ratio. Possible explanations include: low first call resolution (repeat work), customers having difficulty in understanding bill and other written communications, customers calling more frequently to negotiate collection terms, IVR technology that increases call-backs, and companies who are stimulating customers to call the utility, e.g., collections, marketing.

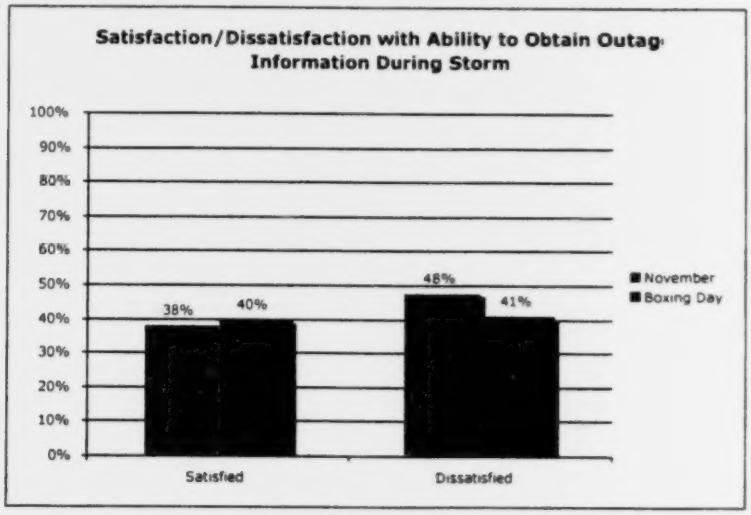
3. Recommendations

NSPI should conduct further customer research to understand better customer expectations as well as the current customer experience.

Nova Scotia Power has been researching customer opinion and satisfaction for more than 15 years. It has conducted more than 150 individual customer research studies since 1987, mostly through outside agencies. NSPI was diligent in researching customer opinion following the Hurricane Juan outage as well as the November and Boxing Day storms of 2004. In addition,

NSPI conducts annual customer satisfaction surveys and in the past few years has surveyed customers relating to environmental issues, energy preferences, and heating solutions.

Customer research of the November storm and the subsequent Boxing Day storm confirms the difficulties customers were having contacting NSPI's Power Outage Line and Customer Service Line. During the November storm, 48 percent of customers who lost power were "mostly dissatisfied" or "completely dissatisfied" with their ability to obtain information on the outage while without power. The level of dissatisfaction was slightly less during the Boxing Day storm—41 percent of customers were "mostly dissatisfied" or "completely dissatisfied" with their ability to obtain information on the outage while without power. While there was a slight improvement from November to December, the fact remains that close to half of customers were dissatisfied with their ability to obtain information about the outage during the time they were without power.[153]



NSPI should conduct further customer research, whether through polling, focus groups, or other surveys, to understand better customer expectations for service—both during normal business as well as during an outage or emergency situation. Clearly, the level of dissatisfaction with the outage information provided and the channels to provide the information indicate the need to better understand expectations. In the case of the outage or storm, this includes finding out:

- The preferred and optional channels of communication. How do customers want to contact the company? Other ways that might be quicker? Self-service versus "live person"?
- What information do customers need and at what point in time?
- Are there proactive ways in which the utility can communicate and alleviate the need for the customer to contact the utility? In what situations?
- Do customers want to report the outage? How and why?

[153] Response to Information Request IR-90, interviews with NSPI personnel, documents provided during interviews.

- What will make customers feel more confident that the company knows about their power outage at their location? That crews will be responding soon?

Additionally, NSPI should conduct research with other key stakeholders to better understand each groups' individual communications needs, including government officials, large customers, critical care customers, EMO coordinators, other emergency and public safety organizations, and the media. The public outcry and feedback from other organizations during and following the November storm indicate that NSPI did not meet information expectations. NSPI should pursue focus groups, debriefings, follow-up meetings, pre-season meetings, and other approaches to understand better how it can better communicate and work with all stakeholders in future events.

NSPI should redesign its call center technology to improve communications with customers during a large outage or storm.

- NSPI must make it easier and quicker for callers to report an emergency, especially during large outages

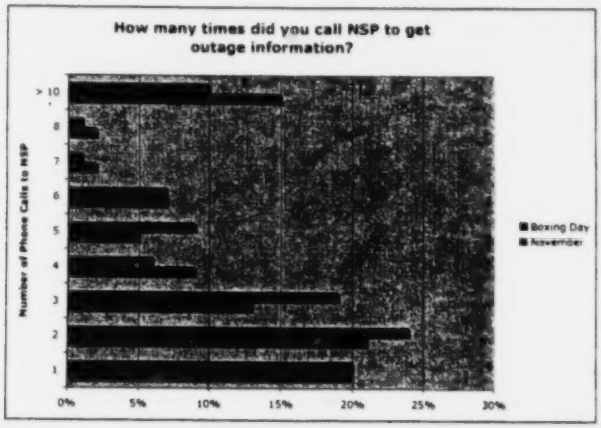
- NSPI should alleviate the telephony capacity restraints so callers are no longer disconnected, either politely or impolitely

- NSPI should alleviate the telephony capacity restraints so more customers can report outages sooner

- NSPI should eliminate all blocked calls on its Customer Service Line.

Sixty-three percent of affected customers surveyed after the Boxing Day storm reported calling NSPI's Outage Line at some point during the storm. In fact, many customers reported calling many times during both storms, as shown in the chart below. On average, during the November storm, customers reported calling NSPI five times during the storm to obtain outage information. During the Boxing Day storm, customers reported an average of four calls.[154]

[154] Response to Information Request IR-90, interviews with NSPI personnel, documents provided during interviews.



Customer polling after both storms confirms the needs of customers during an outage. The top three reasons—obtain an estimate of when power will be restored, to report that the power is out, and to find out more about the cause and size of the outage. During the November storm, 37 percent of customers indicated they called to report the outage; this grew significantly in the Boxing Day storm when 55 percent indicated they were calling to report the outage.

Customer expectations and behavior during an outage are unique. NSPI's consumer research following the November storm revealed that 95 percent of customers who called the Outage Line did so within the first 24 hours of the storm. Other industry research indicates that 40 percent of affected customers call during the first 30 minutes of an outage.

To be responsive, NSPI has to be prepared to accommodate a large number of calls following an outage. In the November storm, at the peak, there were over 160,000 customers without power. According to NSPI research, this means at least 150,000 customers are likely to call NSPI during the first 24 hours. On average, NSPI receives about 2,000 calls each business day. Clearly, the extremely high volume of calls following a large outage dictate the need for a technology solution, it is not cost effective or feasible to answer this many calls with agents.

This is a common problem for all electric utilities—how to effectively respond to a sudden extreme peak in call volume associated with a large outage. Solutions have evolved over the years, with the development of various technologies and service provider solutions. There are three basic "peak" call handling approaches:

1. Block calls (busy signal to customers) to a manageable level (within the capacity of your call center staff and/or IVR technology).
2. Provide an outage "message" to many callers; immediately terminate the call or let queue limitations in the IVR or agent queue force callers to "choose" to abandon if hold times become too long.
3. Let as many customers as possible notify the company of an emergency, report an outage or inquire about the status, with the help of technology.

The industry best practice is option 3—let as many callers as necessary into your system to accept their outage reports and to deliver customized messaging about how the outage affects

that caller. It is cost prohibitive to configure an IVR system big enough to handle the biggest spike in your call volume. Another more economical approach is to outsource or offload overflow to a third-party IVR when call volumes exceed your capacity—effectively renting the capacity when you need it. Many large investor-owned electric utilities in the U.S. have adopted this approach, renting a high volume outage handling IVR service, when necessary, to handle overflow.

NSPI evolved its technology strategy from option 1 to option 2, after its experiences with outages in the late nineties—it has chosen to deliver a somewhat customized "message" hoping that most callers will be satisfied and hang up after hearing the message. NSPI's HVCA can handle 500 or so simultaneous calls from each of 31 geographic areas, effectively delivering the "message" to many people at the same time, as long as call volume does not exceed this level in each geographic area. While NSPI's IVR is equipped to accept outage reports and to deliver outage status, it will become overloaded if more than 1,400 callers per hour decide to stay on the line after hearing the message. Even if NSPI can increase its capacity limitations to avoid disconnecting callers, callers will ultimately be subject to long hold times waiting for the IVR or an agent.

In addition, NSPI's approach made it very difficult for callers reporting an emergency to get through to a live person—these calls were not given any priority over other callers wishing to remain on the line. While NSPI tried to tell customers to only remain on the line in the event of an emergency in its message, this was not an effective solution. These calls need top priority.

NSPI should redesign its call center handling technology to deliver the best possible service to customers by moving to option 3 described above. Not only is this a "best practice" that has been deployed by many electric utilities in the U.S. and several in Canada, it also enables NSPI to provide the best possible service to all affected NSPI customers in a Level 3 or 4 outage. It also lets NSPI configure an interactive menu that will give top priority to emergency calls. Customer research results can be incorporated into the design of the menus, scripts, and applications. At a minimum, NSPI should use carrier-level/network routing so that callers reporting emergency concerns can be routed to a live person immediately.

NSPI should also reroute calls from its Customer Service Line, when necessary, into this overflow solution so as not to block any callers, especially during a large or concentrated outage. This will ensure that all calls are handled consistently and eliminate NSPI busies.

Additionally, this recommended approach provides the best possible solution towards resolving an outage call on the first contact. With the expanded capacity to accept outage reports and provide individualized outage information to all affected customers calling into the company, NSPI no longer has to encourage callers to call back when they are not so busy. Instead, the call can be handled and resolved right away, hopefully minimizing the need for customers to call back five or more times during an outage.

NSPI should rigorously test call-handling technology to ensure it operates to expectations and specifications.

NSPI recently replaced several key components of its call center supporting systems, including: switching and queue management equipment, call routing technology, the IVR, staffing and scheduling, and call monitoring software. NSPI implemented the new technology as a "hosted" solution through Aliant. Several of the technology failures encountered during the November storm related to the configuration and operation of this new technology.

NSPI failed to rigorously test the configuration of the new technology prior to acceptance and cutover to production. The uncovered problems were responsible for garbled messaging, slow performance, and agents sitting idle while calls piled up in the IVR. NSPI did not have a technology contingency in place should it experience unexpected problems or failures in its high volume call answering system. In the future, NSPI should formalize its technology testing and acceptance criteria to ensure that it avoids technical failures of this nature. In addition, it should (1) test any changes to the technology configuration to ensure that the changes produce the desired results and not a failure of another nature and (2) maintain contingencies for any unexpected difficulties or failures.

NSPI should have tested the HVCA technology when it implemented the system in 1999 to ensure that it worked as designed and purchased. Capacity or "stress" testing of call answering systems is both feasible prudent. NSPI's HVCA design clearly was inadequate to handle the high call volumes associated with the November storm and even the Boxing Day storm. NSPI should pursue a testing procedure or service, both of which are available, to "stress" test all call center technologies and other customer-facing technologies. It should also test all supporting systems to ensure that they are capable of handling the high volume of transactions generated by extremely high call volume—for example, confirming that OMS operates as desired while receiving and analyzing an extremely high volume of outage tickets. A holistic testing approach will eliminate failures in background systems as well as front-facing technologies.

As part of this testing, NSPI should complete a complete analysis of the systems and technologies supporting outage response to identify hardware/software risks, optimum redundancy, back-up strategies, and future utilization. It should document all interrelated business processes and interdependencies so that it knows and understands the implications of failure of various components. NSPI should make sure it has the appropriate contingencies in place to deal with the implications of power failures in its storm response and call centers, network downtime, and failures of any of the systems or technologies supporting storm response and communication. This includes establishing back-up power, redundant systems and databases, spare parts and equipment, on-call or on-site support, as well as manual business continuity plans.

NSPI should examine why customers are contacting the company and NSPI's customer service response to determine if more calls can be resolved on the first contact, thereby increasing customer satisfaction.

Because NSPI exhibits significantly higher calls per customer than other electric utilities, NSPI should consider reviewing its call volumes by call type to understand better why customers are contacting the company. At the same time, NSPI should examine its customer response to determine if company processes or technology is encouraging repeat callers, for all types of customer service, including outage response.

While repeat calls may be more likely in an outage situation, NSPI should still examine its technology and processes to minimize the number of times that a customer must contact the utility to obtain information or status on an outage. NSPI should make every attempt to resolve or respond to the customer to reduce the need to call back.

As part of this exercise, NSPI should initiate "first call resolution" tracking to find out what percent of calls are resolved on the first contact. This involves putting a measurement system in place to track first call resolution as well as a diagnostic, root-cause analytical process to get to the reasons behind repeat calls and to fashion a solution. First call resolution should be measured by internal metrics as well as customer perception. Measurement must be granular enough to be actionable. That is, agent-level first call resolution performance will drive training and coaching needs, and first call resolution by call type will drive root cause analysis and process improvement. First call resolution performance must also be measured through customer opinion.

First call resolution may be one of the best predictors of customer satisfaction—the higher the first call resolution, the higher the satisfaction. Creating unnecessary call-backs increases the cost to handle a call. Repeat calls also lower customer satisfaction. Focusing the call center and supporting processes on achieving first call resolution can increase customer satisfaction as well as reduce overall operating costs. By examining its first call resolution performance, NSPI can make sure that it is supporting customers through efficient and effective customer service.

NSPI should continue staging call center agents in nearby hotels in preparation for a Level 3 or Level 4 storm, especially one that makes travel to the center difficult or unsafe.

To be adequately prepared for the high volume of calls into its call center during a large outage, NSPI should have adequate and experienced agents on hand to respond. This could be a combination of NSPI employees and third-party agents, if the agents have appropriate access to NSPI information systems and restoration information. In either case, NSPI should be prepared to staff fully its 100-seat center to be able to respond to the 1,200 to 1,400 incoming calls that its trunking allows.

Since the November and Boxing Day storms, NSPI has moved to a pre-storm staging strategy for its call center agents. Agents sign-up weekly for "storm center" duty, volunteering to handle certain shifts, if needed. NSPI developed a call-out process and asks agents to come to the center

prepared to spend several days away from home, if necessary. It arranges for rooms in a nearby hotel, along with meals and other logistics. NSPI tested this approach in the January 23-24 storm. NSPI staffed the center at near capacity very quickly, with agents housed in the nearby hotel. While the January storm was not nearly as severe as the other two prior storms, the call center was successful in meeting its service level of answering 50 percent of all calls in 120 seconds 100 percent of the time during the storm, with average wait times of 5 seconds or less.

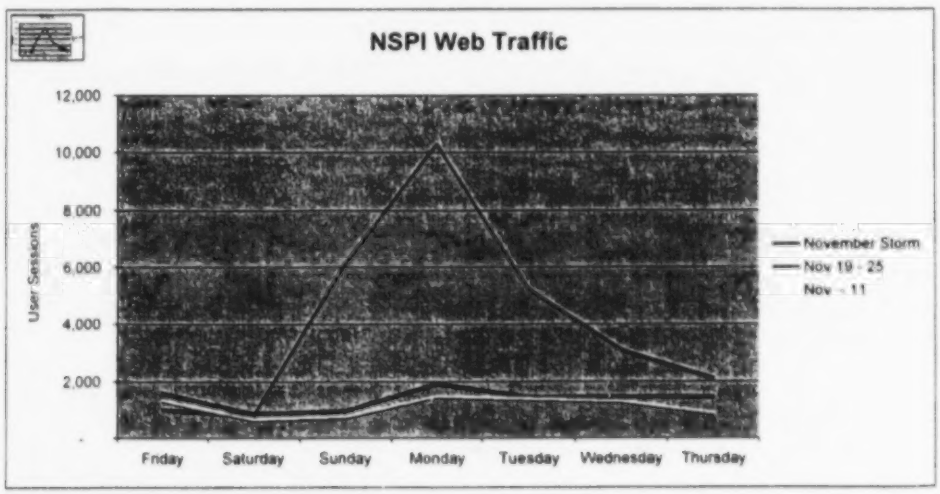
NSPI should continue this pre-storm staging strategy for future Level 3 and Level 4 storms and outages, especially when conditions make travel difficult or unsafe for agents.

NSPI should incorporate e-mail response in the customer contact plan.

NSPI should amend its Emergency Service Restoration Plan (ESRP), specifically the Customer Contact Sub-Plan, to include a process to monitor and respond to customer e-mail inquiries during Level 3 and Level 4 situations. NSPI should dedicate resources to respond effectively to all storm-related inquiries. It should clearly delineate a process to ensure responsibilities and accountabilities. NSPI should also review its web site to make sure it promotes the Outage Line during the storm and not the general Customer Service Line, specifically on the "Talk to Us" page.

NSPI should provide additional channels of communication between the customer and the company.

NSPI experienced a significant increase in web traffic during the November storm, as seen in the following chart.[155]



[155] Interviews with NSPI personnel, documents provided during interview.

Unfortunately, aside from sending e-mail, visitors were limited to reviewing press releases and general information about the storm. The NSPI web site did not permit customers to report an interruption in power nor obtain status or restoration information.

This is an opportunity for NSPI. Many electric utilities across North America are providing some level of outage information on the web site, from listings of affected areas and numbers out to specific restoration status and estimated restoration times. Several utilities have also established self-service outage reporting through the corporate web site, providing yet another way for customers to let the company know they are without power. While the number using these services is much smaller than those calling in, it does open another channel of communication.

This is becoming more and more important with the growing popularity of web-capable cell phone technology, public Wi-Fi networks, PDAs that enable mobile internet access, e-mail, and instant messaging. While individual residences may be without power, businesses and public areas may have power, giving the public better access to the Internet, even during an outage.

A current trend in customer service is to provide a consistent user interface, whether dealing with the customer through the IVR, web site, or a kiosk. Self-service options can be designed and built to provide the same features in the IVR as on a web site, providing a more consistent customer experience. NSPI should investigate adding interactive, self-service options to its web site to provide storm information to customers and the public, including the number of customers out, the affected areas, and to the extent possible, estimated restoration times. Additionally, NSPI should investigate accepting web-based self-service power interruption reports, letting customers who can access the Internet, report their outage through NSPI's web site, if they so desire.

NSPI should take whatever steps necessary to communicate its Emergency Service Restoration Plan and event-specific priorities to key emergency planning personnel, elected officials, and the public.

It is clear that NSPI customers, the public, the media, and government officials were frustrated with the communications failures of the November storm. The technology failures and the extent of the storm created a communications breakdown. While it appears the Emergency Service Restoration Plan (ESRP) was instrumental in the coordination and guidance of restoration efforts, the lack of communications frustrated and stressed many directly or indirectly involved. Follow-up meetings and reviews highlighted the need to strengthen communications with emergency coordinators, public safety organizations, and government officials.

While NSPI finalized its ESRP in August, it has not communicated it properly to all key constituents. NSPI should make the plan available to key emergency planning personnel, public safety organizations, and governmental officials, and keep these groups updated as it updates or revises the plan. In addition, NSPI should:

- Communicate with key emergency planning personnel before winter and summer storm seasons, to review the ESRP and to confirm that all critical infrastructures are known

- Ensure that elected officials in all area of its service territory have direct access to information regarding storm preparedness and restoration
- Promote outage information phone number and outage reporting service to set customer expectations.

NSPI should develop specific, measurable goals and objectives for improving the accuracy and timeliness of outage related information provided to its constituents.

The most important goal for any electric utility regarding outages is to avoid them to the extent possible. Second, when outages do occur, it is important to restore service to customers as soon as possible. NSPI will undoubtedly experience additional outages in the future, and should develop goals and objectives for communicating with its constituents prior to, during and after those outages.

The first goal should be to provide more frequent and reliable information to constituents prior to outages occurring. This should apply to planned service interruptions as well as anticipated conditions such as storms.

Communications related to unexpected outages are usually reactive in nature. However, utilities can make communications in these situations more proactive. Customers complain less when they have been informed. NSPI can also be more proactive by warning customers when weather conditions indicate that storms are likely to cause outages. It can accomplish this through bill inserts and other mailings sent out during storm seasons, as well as through radio and television announcements and newspaper articles.

NSPI should establish goals to improve the accuracy of estimated restoration times. NSPI has begun measuring and tracking the accuracy of Estimated Restoration Times (ERTs). This is a positive step towards the creation of accurate and timely ERTs.

NSPI should revise outage communication procedures to provide more emphasis on the importance of providing accurate and timely ERTs to customers. Procedures should include documenting the estimate that it originally provided to each customer and a requirement that it provide an updated estimate prior to expiration of the existing estimate. It should offer an explanation to the customer if the estimate changes. During each outage, NSPI should record a complete history of ERTs given to each customer.

Finally, NSPI should implement goals to communicate better with constituents in the aftermath of outages. It should analyze customer complaints to determine whether it is making improvements regarding pre-outage notification and estimated restoration times. Debriefing sessions should be held with all involved employees, including crews, customer service representatives, and communications personnel. The Company should also hold meetings with city and town officials, other government agencies, the Board, and the media.

B. Outage Management System

1. Background

The Board asked Liberty to review NSPI's Outage Management System and comment on the performance of that system during the November 2004 storm event.

As described in NSPI's January 18, 2005, Report to the UARB, NSPI's Outage Management System (OMS) works with other NSPI systems to identify outage locations, determine or predict the outage impact, support restoration, and facilitate outage notification and communication. NSPI "went live" with CES International's Centricity Operations Resource Management software in April 2002 (CES is now owned and supported by SPLWorldGroup, Inc.).[156]

The OMS receives outage-event information from NSPI Dispatchers, its SCADA system, Service Sentry devices, IVR, and call center representatives (through the OCE system). OMS analyzes outage event information, employing NSPI's GIS distribution system electrical model, to identify common interrupting devices, generate an outage incident, and notify dispatch so that it can appropriately dispatch crews to restore service.

Traditionally, utilities have relied upon customers to determine the location and extent of an outage—customers call the utility when the power is interrupted and by sorting and analyzing the outage "tickets," management can determine and dispatch the appropriate resources. Outage Management Systems have automated the analytical process, helping utilities more quickly identify outages and begin restoration. Customers continue to play an important role, by reporting their individual outage, in determining the extent and location of an outage, and will until distribution automation can be deployed at the meter.

2. Analysis and Conclusions

NSPI's Outage Management System (OMS) adequately supported NSPI's Storm Restoration and Communications.

A review of the OMS operation during the November and subsequent storms reveals that the system operated as expected. It adequately supported the storm restoration effort and outage communications. The system was available to call center agents and dispatchers throughout the storm. It readily accepted outage reports from call center agents, dispatchers, the IVR, and sentry devices.

NSPI's OMS is comparable to those used by other electric utilities across North America.

CES (now SPL WorldGroup) is a leading provider of Outage Management Systems, and well respected within the industry. CES Centricity is used by more than 40 utility customers on five

[156] Interviews with NSPI technology personnel

continents, including Georgia Power, Northeast Utilities, Baltimore Gas & Electric, Xcel Energy, AEP, Alliant Energy, BC Hydro, Oklahoma Gas & Electric, Public Service Electric & Gas and WE Energy to name a few leading utilities. Industry analysts estimate that CES has more than 40 percent of the OMS market share in North America.

NSPI management forced OMS to withhold ETRs.

As prescribed by NSPI's ESRP for a Level 3 storm, management turned off the ETR prediction component of OMS to delay providing ETRs until it could complete a full damage assessment of the outage. Due to continuing storm conditions, NSPI's damage assessment was not completed until Tuesday, November 16. As a result, it did not provide detailed ETRs until noon on Tuesday. The following message was delivered by the Power Outage Line, IVR, customer service agents, and Corporate Communications up until noon on Tuesday:[157]

> *As of 5 pm on Monday, a severe winter storm has damaged Nova Scotia Power's system across the province causing widespread outages. Crews are assessing damage and it is likely to be several days before power is fully restored. Listen to your local media for updates. Please stay on the line if you have an emergency.*

While NSPI was working according to its ESRP, the decision to withhold ETRs and provide a general message was very frustrating for customers and call center agents trying to be responsive to customer inquiries. The failures of the call center technology aggravated the lack of storm and restoration information.

By the time NSPI began providing detailed ERTs by region, only 22,000 customers remained out of power. The call center was receiving about 1,100 calls per hour, down significantly from the peak of 43,000 calls per hour on Sunday.

While the system was designed to deliver ERTs, management disabled ERT delivery until very late in the storm, deciding instead to rely on the above generalize message.

NSPI's adoption of an early ETR is sound and reasonable.

Due to the sensitivity relating to the lack of available outage information during the November storm, NSPI management has now made a concerted effort to develop an early ETR, or Smart ETR, which can be used initially during a large-scale outage. The Smart ETR is built ahead of time, based on historical restoration performance and factored based on the expected nature and scope of the event. The idea is to present a "best guess" based on all known factors going into a storm so customers can have an expectation of how the storm will affect their specific area. This "best guess" can then be modified, as necessary, as more is known about the specifics of the outage.

[157] Interviews with NSPI personnel.

NSPI used this approach somewhat in the Boxing Day storm and the January storm. Because it relies on predictive methods, the Smart ETR process will continue to be enhanced and improved as it is employed to support both day-to-day outages as well as larger events. Management has also created a review and evaluation process to compare estimates to actual for the purpose of improving future estimates.

NSPI has formalized the Smart ETR process for inclusion in the ESRP. The sub-plan specifies the establishment of an overall ETR Coordinator and ETR Monitors within each Region. The ETR Coordinator is responsible for monitoring storm conditions, outage and restoration progress, estimating outage duration, and ensuring that up-to-date ETRs are posted in a timely manner. The ETR Monitors are responsible for continual posting, monitoring, and revision of customer restoration messaging for specific restoration nodes during a Level 3 and 4 event.

While Smart ETRs are still an estimate, NSPI's approach appears to be sound and reasonable. The ETRs are available in OMS and can be accessed by call center agents, customers, through the IVR and Power Outage line, as well as Corporate Communications. The establishment of an ETR Coordinator in the ESRP formalizes the process during a Level 3 and 4 event as well as assigns accountability. The process manages the development of the early ETR and monitors in-progress ETRs to ensure better accuracy and ultimately, better information for customers.

C. Lessons Learned

1. Background

The Board asked Liberty to assess and comment on NSPI's response and lessons learned from prior weather-related events with regard to communications. To respond to this request, Liberty reviewed the report detailing NSPI's response to Hurricane Juan, the follow-up on NSPI's response to Hurricane Juan, NSPI's report detailing the events of the November storm, and lessons learned from the November storm.

As detailed in the follow-up on Nova Scotia Power's Response to Hurricane Juan, as of January 15, 2005, NSPI had satisfied 46 of the 49 recommendations, with activities ongoing on two items. The items relating to this section were all completed prior to the November storm, including:

- Upgrade to the OMS system to improve utilization
- Corporate Communications coordinator reports to Storm Lead during Level 3 and 4 storms
- ESRP Communications Sub-plan was created and filed with the UARB in October 2004.

Improvements were recommended concerning the HVCA. However, NSPI was reluctant to redesign the system, indicating it would be too costly. NSPI's solution was to create a "friendlier" disconnect message so callers would understand why they were being disconnected. In addition, NSPI was looking at options to route overflow calls to other call centers, including Bangor Hydro and Aliant, as well as adding trunks. The performance of HVCA in the November

storm suggests that this solution was inadequate. Liberty discusses in detail the failures of the HVCA earlier in this section, as well as providing recommendations for improvement.

2. Analysis and Conclusions

NSPI's ESRP has a clearly defined approach to post-storm review and lessons-learned development.[158]

As documented within the ESRP, NSPI will conduct post event critique session within 3 days after any Level 3 and Level 4 storm event and plan drill. The post-event critique process is initiated and led by the Storm Lead Alternate to review the event, its impact on the power system, and to evaluate the overall effectiveness of the restoration effort.

The ESRP describes in detail the post-event critique process, including steps, involved parties, and a list of items to consider. Corrective action plans are produced as a result of this session.

NSPI conducted the post-event critique meeting at the EOC on Monday, November 22, within 3 days of the end of the November storm. Each functional area completed internal debriefings by November 30, 2004.

As a result of the ESRP debriefing process, 74 action items were created after the review of the November storm. More than half of these action items are now complete (43 of 74), 30 percent are pending and 12 percent are in progress.

Additionally, refinements to the ESRP have been incorporated into a revised plan as of January 21, 2005.

The Customers Service organization has identified 30 action items to address issues arising from the November storm.

As a result of the ESRP debriefing process and subsequent Customer Service and Communications debriefings, 30 call center technology action items have been created. NSPI's Customer Coordinator Lead is responsible for the management of these action items, relying on NSPI resources for resolution. As of late February, 8 of 30 items are complete.

Action items address the failures of the call center technology during the storm as well as address the overall customer experience. In general, the 30 items fall into the following basic initiatives:

- Fix technology bugs and failure points from November storm
- Formalize vendor support
- Enhance internal call center operational performance reporting
- Formalize NSPI's technology support and systems change process
- Enhance the customer experience.

[158] Responses to Information Requests IR-75 and IR-91, and Sherrod IR-34, interviews with NSPI personnel.

Liberty recommends that NSPI review and update the Customer Service action items to incorporate the findings and recommendations made in this report.

POWER SYSTEM OUTAGE RESPONSE, LLC

Helping Achieve Excellence in Electric Utility Major Outage Response

Report to the Nova Scotia Utility and Review Board Review of Nova Scotia Power, Inc Response Winter Storm – November 13/14, 2004

March 7, 2005

Power System Outage Response, LLC
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Report to the
Nova Scotia Utility and Review Board
Review of Nova Scotia Power, Inc Response
Winter Storm – November 13/14, 2004

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Pursuant to a Work Task Order of the Nova Scotia Utility and Review Board (the Board), John E. Sherrod d/b/a Power System Outage Response, LLC (Consultant) submits the following assessment of the response of Nova Scotia Power, Inc. (NSPI) to the winter storm of November 13/14, 2004. (See resume of Consultant's experience in Appendix A.) The scope of this report includes:

1. An assessment of the causes of damage to the distribution system in the subject storm, specifically the 155 distribution poles reported as broken by NSPI.
2. An assessment of the adequacy of NSPI post-event inspection and repair processes.
3. An assessment of the condition of the NSPI distribution facilities in general, including facilities in areas not impacted by the subject storm.
4. An assessment of the adequacy of the NSPI distribution inspection process and overall distribution asset management strategy.
5. An assessment of the appropriateness of the staffing level of NSPI power line technicians in providing timely restoration of power and adequate ongoing inspection and maintenance of the distribution system.
6. An assessment of the NSPI preparedness for, response to, and actions following the subject storm in light of Consultant's April 8, 2004 Hurricane Juan report.
7. Summary of Consultant's opinion of the assessment of the NSPI response to the subject storm, based on the above, along with recommendations for improvements as indicated.

I. Executive Summary

The two largest power outage events in the history of NSPI have occurred within 14 months of each other. Hurricane Juan interrupted service to up to 300,000 of the NSPI customers at its peak on September 29, 2003.[1] On November 14, 2004, the winter storm which is the subject of this report resulted in peak outages of over 167,000.[2]

These two events coming in short order have had a significant impact on NSPI and its customers. As the peak impact of the November 13/14 storm was felt, the following questions (among others) arose among NSPI customers and other stakeholders.

- Why would a "normal" Nova Scotia snow storm such as this cause such damages and outages?
- Why can't NSPI get my power restored more quickly?
- Has NSPI implemented any of the recommendations of the Hurricane Juan consultant?
- Why doesn't NSPI have more information about when power will be restored, and why don't they communicate it to us?

In seeking to help the Board find answers to these questions and to address the issues included in the scope of the report as listed above, Consultant propounded 35 specific Information Requests to NSPI, spent three days in direct meetings with the appropriate

[1] "A Report to the Nova Scotia Utility and Review Board on Nova Scotia Power, Inc.'s Response to Hurricane Juan", April 8, 2004; Executive Summary, page 5.
[2] NSPI report to the Board on the November 13/14, 2004 storm, filed January 18, 2005; chart on page 10.

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NSPI personnel, performed a riding patrol of NSPI facilities with NSPI personnel and/or Board staff for four days, met with representatives of the Halifax Regional Municipality (HRM), and carefully reviewed the January 18, 2005 NSPI report to the Board, the NSPI responses to the Consultant Information Requests, and other relevant data.

Details of Consultant's findings, opinions, and recommendations are contained in the body of this report. Below is a summary of the key findings and opinions.

1. **The weather conditions associated with the subject storm could be reasonably expected to cause damages and outages to the extent experienced on NSPI distribution facilities.**
2. **The results of the advance weather monitoring and alert processes indicate that it would be advisable for NSPI to seek a contract with a private weather provider to be used in conjunction with Environment Canada.**
3. **The damages caused to NSPI distribution facilities by the subject storm are consistent with what would be expected with facilities in normal condition subjected to such weather factors.**
4. **The NSPI distribution inspection processes, both routine and post-event, appear adequate and appropriate to good asset management.**
5. **The damages resulting from the subject storm were not a result of any deficiency in NSPI inspection and maintenance processes.**
6. **The staffing levels of NSPI power line technicians (PLTs) as maintained for the past ten years and available at the time of the subject storm are within customary limits in the industry and did not have a negative impact on maintenance of NSPI distribution facilities or on storm outage response.**
7. **The NSPI Customer Average Interruption Duration Index (CAIDI) has increased over the past ten years coincident with the PLT staffing level reduction, and this issue should be addressed.**
8. **NSPI has made a sincere and effective effort to respond to the recommendations of Consultant's April 8, 2004 Hurricane Juan report, has in fact implemented to some extent all of the recommendations, and put these to good use in its response to the subject storm.**
9. **The NSPI response to the subject storm was effective and utilized an appropriate amount of workers to complete the restoration in an amount of time well within acceptable limits in the industry.**
10. **The NSPI response to the subject storm revealed that there are still some significant opportunities for improvement in their communications processes.**

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II. Background

Consultant issued his report to the Board, "A Report to the Nova Scotia Utility and Review Board on Nova Scotia Power Inc.'s Response to Hurricane Juan" on April 8, 2004, and NSPI responded on May 14, 2004. By letter dated June 30, 2004 to Mr. Ralph R. Tedesco, NSPI Chief Operating Officer, the Board advised NSPI of the ongoing engagement of Consultant "to ensure that the appropriate measures are implemented to improve NSPI's response to potential future events of this nature."

As part of its follow up to Consultant's recommendations, NSPI developed the "Emergency Services Restoration Plan" (ESRP) which was filed with the Board on August 13, 2004. Consultant reviewed the ESRP with the NSPI team charged with developing it, and provided input prior to its finalization and filing with the Board. In the subsequent weeks, Consultant worked closely with the NSPI team in developing plans for an "internal review workshop", which was held September 16, 2004. Consultant participated as a technical resource.

Consultant continued to work with NSPI in the roll out of the ESRP and in action items related to implementing other recommendations not directly related to the ESRP. At the time of the November 13/14 winter storm, Consultant and a NSPI drill design team were in the process of developing plans for a simulated drill to be held December 6, 2004. Because of the impact of the November storm, it was decided to cancel these plans.

Subsequently Consultant was engaged by the Board to perform the review which is the subject of this report.

III. The Storm and its Effect on NSPI Distribution Facilities

There is a widely held opinion that the winter storm of November 13/14 was no different than the "normal" Nova Scotia snow storm and should not have caused the amount of damage and power outages it did. Consultant does not share this view. The weather data on snow and ice accretion and wind gust velocity present a picture of conditions that normally cause significant damage and outages on a utility's distribution facilities.

Environment Canada (EC) reports that this storm did indeed have significant weather factors that made it something other than the "normal" Nova Scotia snow storm. Here is what EC had to say about the storm: *"Of more significance was the character of the snow and accompanying winds. The heavy snow was especially wet and sticky, with probably twice the adhesion of the snow from White Juan. Adding in rain, light freezing drizzle and ice pellets, along with close air and dew-point temperatures, created weighty snow accretion on wires and towers of 10 to 15 cm thickness. But that's not all! Push those thick sheaths of snow with strong gusty winds at 75 km/h and you get an enormous stress load on trees, power lines, and transmission towers."* [3]

[3] NSPI report to the Board on the November 13/14, 2004 storm, filed January 18, 2005; page 4.

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The field inspection conducted by Consultant confirms that the damage experienced to NSPI wood distribution poles is consistent with what would be expected with facilities in normal condition subjected to such weather factors. A number of wood poles which were broken during the storm failed at the point of the telephone and cable television attachments – a typical point of stress some fifteen feet or higher above the ground. A visual examination of the broken segment still at the site reveals that the wood was still sound. Rather, the break occurred where the stress was greatest and the pole had been drilled for the cable attachments. Had the pole been defective and subjected to this type stress, it is much more likely that the pole would have failed at ground level.

IV. NSPI Preparedness, Response and Actions Following the Storm

a. NSPI Power Line Technician (PLT) Staffing Levels

NSPI, like almost all other utilities in North America, has for some years worked to reduce permanent staffing levels, utilizing increased efficiencies to enhance productivity and bringing in outside contractors to augment the permanent workforce for special projects and times of peak workload. Reduction in permanent staffing of line personnel can impact the utility's ability to adequately perform in three areas within the scope of this report – response to major outages, routine inspection and maintenance of facilities, and response to routine outages. NSPI records indicate that the permanent staffing level of Power Line Technicians (PLTs) has been reduced by 23% over the past 10 years, from a high of 287 in 1994 to 221 in 2004. Of the total in 2004, 185 are NSPI employees, and 36 are "base line" contractors (i.e. contract linemen retained as a part of the normal lineman workforce). [4]

In the April 8, 2004 Hurricane Juan report, Consultant made the following statement, *"Permanent staffing reductions of utility line personnel are not based on the numbers needed for response to a major event such as Juan. Rather, they are based on normal revenue and maintenance workload, routine storm response requirements, and other factors such as productivity and process improvements, etc."* [5] The significance of this fact is that in the responses to both Hurricane Juan and the November 13/14 winter storm, the ability to respond adequately to the emergency is more dependent on the aggressive, proactive recruiting of outside allies than it is on the amount of permanent staffing in place at the time. As will be seen later in this report, NSPI did a much better job in the November storm of recruiting outside help early and deploying them quickly.

With regard to the issue of permanent staffing level reductions and their impact on the ability of NSPI to do an adequate job of inspecting and maintaining their distribution facilities, Consultant does not find that the staffing levels have been reduced to a level that would have a negative impact in this area. Consultant validated this conclusion to his satisfaction by performing a riding patrol of NSPI distribution facilities in several different geographic locations within the Province. Consultant found the state of NSPI

[4] NSPI response to Consultant's Information Request # IR-13.
[5] "A Report to the Nova Scotia Utility and Review Board on Nova Scotia Power, Inc.'s Response to Hurricane Juan", April 8, 2004; page 49.

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distribution facilities to be very good – better than the condition of similar facilities at other utilities of which Consultant is knowledgeable. The NSPI System Average Interruption Frequency Index (SAIFI) performance supports Consultant's conclusion that NSPI PLT staffing level reductions have not negatively impacted the inspection and maintenance of distribution facilities. This index, which compares the number of outages from year to year, has shown a decline over the past ten years – the period in which the staffing reductions have occurred.[6]

In the area of response to routine outages, there appears to be some evidence that the NSPI performance in this area has deteriorated slightly in the past ten years, coincident with the period of PLT staffing reduction. A review of the Customer Average Interruption Duration Index (CAIDI) indicates that NSPI's customer average interruption duration has increased over the past ten years. In comparison to the Canadian Electricity Association (CEA) average – factoring out the two years 1999 and 2003 which reflect major outage events for CEA and NSPI respectively – the NSPI customer average interruption duration has moved from a relative position of equal to or less than the CEA average to a position of equal to or greater than the CEA average during the past ten years.[7] It is possible that these changes are the result of other factors than the reduction of PLT staffing, but since they have occurred coincident with those reductions, the effect must be considered.

In summary, Consultant cannot and does not say that the reduction of 66 PLTs from the permanent NSPI staffing level had no effect on the NSPI response to the November 13/14 winter storm. Had these additional personnel been in place, they would have undoubtedly been put to good use, especially in the early stages of the response, when outside help was en route. However, the negative impact of the loss of this permanent PLT staff was minimized by the rapid recruitment and deployment of outside resources. With regard to ongoing routine maintenance of facilities, NSPI has obviously kept its facilities in good shape despite the permanent workforce reduction. The effect of the reduction of permanent PLT staffing level does seem to have had a negative impact on the customer average interruption duration, and NSPI should review this further to see if some changes in PLT staffing level might be warranted.

RECOMMENDATION 1

NSPI should carefully review the causes of the increase in their customer average interruption duration over the past ten years in light of their permanent PLT staffing reduction and advise the Board of their findings and plans to address this interruption duration increase.

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[6] NSPI report to the Board on the November 13/14, 2004 storm, filed January 18, 2005; chart on p. 73
[7] Ibid, chart on p. 74.

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b. NSPI Inspection Process

NSPI reports that it inspects each distribution feeder every two years. The level of inspection is determined by the reliability performance of each feeder. Poor performers are scheduled for a detailed inspection and the other feeders receive a "due diligence" inspection.[8] Consultant reviewed the NSPI inspection process and inspection forms, as well as the post-event inspection process. These processes and forms are in keeping with generally accepted asset management strategy for distribution facilities. Specifically, the frequency of inspections and the inspection forms are in keeping with industry practice and good asset management strategy. Consultant found no evidence that NSPI inspections failed to detect flawed distribution poles prior to the subject storm, nor did Consultant identify any failure on the part of NSPI to properly address the items found in the inspection process. The damages to the distribution facilities including the 155 broken poles reported by NSPI cannot be attributed to any deficiency in the NSPI inspection and maintenance program.

c. NSPI Response to the November 13/14 Winter Storm

In reviewing this aspect of the NSPI response, Consultant will utilize the recommendations from his April 8, 2004 Hurricane Juan report as a reference to measure the overall effectiveness of the response to this particular event.

The activities of NSPI in responding to Consultant's recommendations in the Hurricane Juan report and Consultant's role in working with NSPI in this activity have been detailed in Section II above. NSPI has made a sincere and effective effort to respond to these recommendations. Consultant has been impressed with the expertise, dedication, and enthusiasm of the NSPI personnel assigned full time to coordinate the revision of the ESRP and the response to other recommendations. By their commitment to this task, they have been able to enlist the enthusiastic support and cooperation of the NSPI response organization. The result is that the new ESRP and response processes have been well received and are now the standard operating procedure for major outage response.

Attached to this report as Appendix B is a recommendation matrix, detailing the status just prior to the November 13/14 winter storm of the NSPI response to each of the 49 recommendations in the Hurricane Juan report, and how these recommendations were put to use in the NSPI response to the November storm. In July, 2004 Consultant met with NSPI and reviewed each of the recommendations, reaching a resolution on how each one would be addressed. Of the 49 recommendations, only three were resolved in a manner that differed significantly from Consultant's original intent.

> Recommendation 3 "NSPI should contract with a private weather service provider, to be used in conjunction with their present arrangement with

[8] NSPI report to the Board on the November 13/14, 2004 storm, filed January 18, 2005; Section 5.5.3, p 75

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Environment Canada." Consultant agreed with NSPI to continue utilizing Environment Canada as the sole provider until more experience could be gained. NSPI experienced difficulty finding a private provider for their area.

Recommendation 28 "The present call processing system should be improved so as to eliminate the necessity for customers to take action in order to remain in queue, and to eliminate the problems experienced with calls being 'dropped' during high-traffic periods." Because of the extremely high cost associated with replacing the system that was custom-built for NSPI, Consultant agreed to the approach of attempting to address some of the concerns by more "caller-friendly" messaging and outsourcing overflow calls to help reduce the load on the system during high-traffic periods. It was agreed that this approach would be reviewed as more experience was gained with future major outage events.

Recommendation 41 "NSPI should take the necessary steps to develop processes and identify and train personnel in order to be able to move some control of the switching, tagging, and work permit process out into the field organization during major outage events." As NSPI expressed serious concerns over being able to make this change and maintain proper safe working conditions, Consultant concurred with NSPI to not move forward with this recommendation, pending review of the impact of this process on outage response during future major events. The ESRP contains an ongoing review process for the switching, tagging, and work permitting activities.

Of these three recommendations, two of them – Recommendations 3 and 28 – were areas of concern in the November 13/14 storm, and should receive further consideration for needed action as a result of this most recent experience.

The matrix in Appendix B provides details of each recommendation. Below are Consultant's observations and comments on some of the most significant areas.

1. Emergency Plan The Emergency Services Restoration Plan (ESRP) has been referenced often already in this report. NSPI has done a very good job in putting together a "user-friendly" restoration plan – one which serves as an effective tool in outlining processes and guiding the actions of key response personnel. The "proof of the pudding" of course is how much the plan is used in an actual event. The ESRP was relied upon heavily during the November storm and served well its important purpose.
2. Corporate Command Team Perhaps the single most significant change in the NSPI approach to major outage response is the formation of the Corporate Command Team. With the command team activated as described in the ESRP, resources are available to support the restoration effort in the field in a much more responsive and coordinated fashion. The Corporate Command Team as set forth in the ESRP captures the key concepts included in Consultant's recommendations from the Hurricane Juan report. Review of the activities and results of the

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command team in the November storm indicate that the team functioned well in the restoration effort.

3. Emergency Operations Center (EOC) Another key addition to the NSPI storm response effort is the establishment of the Emergency Operations Center at the Ragged Lake facility. The "footprint" of the EOC is well conceived and furnishes the necessary dedicated space to offer at the same time isolation from other parts of the building and other activities, and room to locate the essential functions together for better coordination. This new facility was activated at 6:30 a.m. with staff orientation at 9:00 a.m. on Sunday, November 14,[9] and served well the needs of the Corporate Command team.
4. Weather Event Monitoring and Alert Process The weather monitoring and alert process followed by NSPI, as detailed in its January 18, 2005 report to the Board was in accordance with the processes outlined in the ESRP and represent a structured and realistic approach to monitor weather forecasts and assess the potential of a major outage event. As discussed in the NSPI January 18, 2005 report to the Board, the forecasts by Environment Canada did not envision a storm of the magnitude of the actual event. The forecast on Saturday, November 13 issued at 3:56 p.m. Atlantic time, while "indicating heavy rainfall warnings for the Metro and South Shore areas, and a more intense snowstorm in the Western Valley region," [10] still did not fully describe the conditions that actually occurred. Consequently, NSPI did not anticipate nor declare a major event level response (Level 3 or 4) until 5:00 a.m. on Sunday, November 14, as a result of damage to the transmission system.[11] Based on this experience, it is Consultant's opinion that NSPI should aggressively pursue an arrangement with a private weather provider to be used in conjunction with Environment Canada. This observation and recommendation by Consultant are in no way intended as a criticism of Environment Canada, a well respected weather service. However, in Consultant's experience it is helpful to have access to a private weather provider which is dedicated to providing special services to their customers which Environment Canada is not prepared to offer.

RECOMMENDATION 2

NSPI should actively seek a contract with a private weather service provider, to be used in conjunction with their present arrangement with Environment Canada.

5. Event Prediction In Consultant's April 8, 2004 report on Hurricane Juan, it was recommended that NSPI "develop an event prediction model/process to help guide pre-storm planning and activities." [12] NSPI has aggressively pursued this recommendation, developing the "Severe Weather Impact Model". This model was developed prior to the November 13/14 storm, and had been used in

[9] NSPI Response Information Request # IR-19
[10] NSPI report to the Board on the November 13/14, 2004 storm, filed January 18, 2005; page 6.
[11] Ibid, page 7
[12] "A Report to the Nova Scotia Utility and Review Board on Nova Scotia Power, Inc.'s Response to Hurricane Juan", April 8, 2004; page 11.

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predicting potential damage during several smaller weather events which occurred prior to the November storm. The model predicts potential damage/outages in the Counties/Areas identified as "Environment Canada Warning Areas", utilizing the predicted weather factors furnished by Environment Canada. Average wind speed, type of weather event, and predicted severity are variables that are input into the model to produce the event prediction data. In the case of the November 13/14 storm, as mentioned above, the weather forecasts prior to the peak impact of the storm did not accurately predict the actual weather factors experienced. This of course impacted the event prediction model initially, but as the actual data became available, the model was put to good use to help predict the total damage and needed resources.

6. Outage Management System (OMS)
NSPI has done a good bit of work on OMS application and system performance since Hurricane Juan, and all modifications were completed prior to the November storm. The function of OMS during a major outage event is discussed in Section 3.12 of the NSPI January 18, 2005 report to the Board. NSPI reports that the OMS functioned well. Each field operating group ("restoration node") "was assigned a dedicated OMS Connectivity Coordinator who had strong knowledge of the OMS system and understood the electrical connectivity model of the area they were managing." The Control Centre updated the changes to field devices in the OMS model, and OMS operational resources were also involved in dispatching of dedicated crews to deal with emergency/911, environmental, and priority-escalated calls. [13] The overall performance and utilization of OMS was much improved from the experience in Hurricane Juan.
7. Recruitment of Outside Resources and Restoration Results As has been stated numerous times in Consultant's April 8, 2004 Hurricane Juan report as well as in this current report, one of the key factors of a successful response to a major outage event is the early aggressive recruitment of outside resources. The total resources that are brought to bear on the restoration effort and the timing of arrival of these resources have a direct bearing on the rate with which service is restored. NSPI was much more aggressive in bringing in outside resources for the November storm than they were with Hurricane Juan, as can be seen in the chart below.

	Hurricane Juan	November 13/14, 2004 Storm
Peak Number of Customer Outages	300,000	167,339
Total Number of Tool Workers	496	404
Total Days Required To Restore All Service	14	5
Tool Workers Per 1,000 Customers Out	1.65	2.41
Average Customers Restored Per Day	21,429	33,468

[13] NSPI report to the Board on the November 13/14, 2004 storm, filed January 18, 2005; page 39

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NSPI brought to bear on the November 13/14 storm 46% more tool workers per 1,000 customers out than they utilized in Hurricane Juan. Their restoration rate was 56% faster in the November 13/14 storm than the rate in Hurricane Juan.[14] NSPI did a good job of bringing in the outside resources in a prompt, yet staged manner in order to maximize the efficiency of incorporating these workers into their restoration organization. Almost 60 per cent of the total workers were on site within 24 hours, and nearly 90 per cent were on site within 48 hours.[15] As a result of these efforts by NSPI, 85% of all customers who experienced an outage were restored within 48 hours. Another way of saying this is that 143,000 customers of the more than 167,000 customers who lost power had their power restored within 48 hours. Approximately 90,000 customers (54%) had their service restored within 24 hours.[16] These figures speak for themselves and verify that NSPI performed well in bringing resources to bear on the response effort, and in effecting a prompt and efficient restoration of service.

8. Regional Operations The effectiveness of the response organization is directly related to the efficiency of the field organization, including the size and number of operating "sub regions" or "restoration nodes" as they are called in the ESRP. NSPI established three restoration nodes – Northeast, Western, and Metro – based on the amount and location of damage. This organization functioned well in the storm, providing a management framework to incorporate the additional resources brought into the stricken area to help with the restoration. The result of this organization and its performance is reflected in the restoration statistics quoted above. Not only was the restoration rate much improved over that of Hurricane Juan, it compares very favorably to the performance of other utilities in storms of this magnitude.
9. Post-event Critique All successful emergency response organizations have a well structured process to critique the performance of their operation in all major events. NSPI has established a good process as part of its ESRP, and this process was followed after the November 13/14 storm. The "lessons learned" and opportunities for improvement were documented, prioritized, and assigned to specific individuals and groups for follow up. The large majority of the items identified – primarily minor in nature – have already been addressed. Revisions to the ESRP and other restoration processes, as required, are being incorporated into the NSPI overall response plan.

One other major area in the NSPI response effort remains to be addressed. Regardless of how well a utility might perform in the actual restoration effort, these efforts must be accompanied by an effective, accurate, and timely communications process. If not, the public perception of the restoration will be less than desired, and can raise serious questions in the minds of utility stakeholders as to the preparedness and efficiency of the

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[14] "A Report to the Nova Scotia Utility and Review Board on Nova Scotia Power, Inc.'s Response to Hurricane Juan", April 8, 2004; pages 15 and 16; NSPI responses to Consultant Information Requests # IR – 4 and IR – 7.

[15] NSPI report to the Board on the November 13/14, 2004 storm, filed January 18, 2005; graph on page 18.

[16] Ibid, chart on page 45.

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utility's response. It appears clear to Consultant that although NSPI has established communications plans to provide the type of communications needed in such an event, the end result of these efforts in the November 13/14 storm missed the mark and failed to achieve the desired result. In the term "Communications", Consultant includes only two primary areas – Corporate Communications, and communications with external agencies. These will be addressed in the next section of the report.

V. Communications

a. Corporate Communications

A very significant issue which arose in the minds of the customers and other NSPI stakeholders was the action by NSPI to request that customers not call the outage line to report outages. This request was first issued in the NSPI news release on November 14 at 11:45 a.m. The exact wording is as follows:

> "Customers are asked not to call the power company's outage line to report outages at this time. 'We know the power is out. Our remote sentry units and our field reports are identifying the location of the power outages. At this time the phone lines are not able to handle the volume of calls, so please call only to report emergencies and downed power lines,' said Mr. Tedesco."[17]

The problem faced by NSPI which led to their "don't call" decision was a serious one. Due to restrictions on input capacity, they were not able to receive all of the calls being offered. Although they had a message on the HVCA which would have given some information to customers, many of the customers were unable to get through to receive it. More seriously, during the November 14 timeframe, the damage to NSPI facilities was ongoing. As towers and poles collapsed or broke, numerous power lines were down across a broad area. This raised the potential of multiple public safety issues. The concern was that there might be emergency calls to report public safety incidents which would be unable to get through due to the overloaded condition of the call processing system. The decision to ask customers to delay their outage report calls was the right one. To do anything else would have been to shirk the responsibility a public utility has for the safety of the public. The issue really came down to the lack of understanding on the part of the public as to the reason behind this request, and this is a communications issue that must be addressed. There are also the issues of the length of time this request was continued and the absence of any notice when this request was cancelled.

In making the following observations, comments, and recommendations, Consultant is aware that the issue of effective messaging is very subjective. Perhaps more so than in any other area of emergency response, assessment of customer messaging is "in the eyes of the beholder." What may seem to be an effective message to some may not be seen the same way by others. Having said that, what Consultant has to offer is over 41 years' experience in trying to communicate effectively to electric utility customers. The

[17] NSPI response to Consultant's Information Request # IR-29.

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comments which follow are made with a deep appreciation for the challenges involved in this crucial area.

First, in the matter of NSPI's "don't call" messages, Consultant would offer the following observations and opinions:

- The message would have been better received had it been handled as a separate message apart from the general news release concerning the storm. Depending on how much was known at the time about the problems encountered with the call processing system, it would have been well to say something other than "At this time the phone lines are not able to handle the volume of calls." (See footnote 21.) This statement naturally gives rise to the question in the customer's mind, "Why isn't NSPI prepared with a phone system to answer calls during an outage?" A statement such as, "We have encountered problems with our call processing system and are working hard to correct these problems as soon as possible," would have been accurate and more helpful. Also, by handling this as a separate message NSPI could have gone into a little more detail as to the public safety aspect of the "don't call" decision. In fact, the message could have been put out under the heading of "An Urgent Public Safety Message" or something of that nature.
- It appears that NSPI ran this message too long. With the sharp decrease in call volume as shown in the NSPI report to the Board, and the decreased likelihood of new public safety hazards occurring, the serious risk period should have been over by the end of the day on November 14. The message was continued the next day, however. This, along with the comments that customers should not call the municipal governments and that they should look to get their information from TV, radio and newspapers helped create the perception that NSPI did not want to hear from their customers.
- NSPI should have put out a message telling their customers when it was now "clear" to call in their outages. This would have been a good opportunity to again explain the reason behind the request, and thank the customers for their understanding. This would have been especially effective had this message gone out Sunday night, November 14, and then again the next morning.
- Care must be taken to avoid statements that can be misunderstood. The statement, "We know the power is out," could be interpreted as condescending or even sarcastic. The message was not that NSPI does not ever want customers to call in and report an outage, the message was that NSPI needed the cooperation of its customers to ensure that public safety messages were received and resolved during a time when the call processing system was overloaded.

Another complaint mentioned repeatedly by customers following the November 13/14 storm is the lack of information about restoration status and predictions for when service would be restored. In the April 8, 2004 report on Hurricane Juan, Consultant made the following recommendation, "Corporate Communications should take the lead in working with appropriate NSPI operations personnel to develop processes and forms to furnish

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specific, meaningful restoration estimates for external communication."[18] NSPI responded to this recommendation with processes detailed in their Communications Plan which is filed with the Board. During the November 13/14 storm, NSPI put out a message as of noon on Sunday, November 14 that "it is likely to be several days before power is fully restored."[19] Predictions of restoration times by area were developed overnight on Monday, November 15. These predictions were routed according to the process through the Regional Operations Coordinator at the EOC, approved by the Storm Lead and provided for external release by mid-day Tuesday, November 16.[20] It should be noted that according to the restoration curves in the NSPI report, nearly 85% of the customers had been restored before specific area restoration estimates were made available for external communication. In Consultant's opinion, NSPI needs to be more aggressive in getting these estimates out earlier. Experience has taught that the field operations leaders can make an accurate estimate of the time and resources required to restore service in their assigned area within the first day of the restoration. Although not to the level of specific detail by small geographic areas, Consultant is of the opinion that an estimate as to the restoration time for customers in each of the three restoration nodes could have been produced to an acceptable level of accuracy in time for external communications at least by mid-day Monday, November 15.

With regard to reporting restoration status and the general effectiveness of external communications, Consultant offers the following observations and opinions:

- NSPI missed a good opportunity to tell a very good story of the progress they were making in restoring power. As has been pointed out earlier in this report, NSPI's restoration rate was very good, comparing favorably to the industry performance for outage events of this magnitude. Yet the messages that NSPI put out in the first days of the storm did not mention the progress that was being made. This would have been very encouraging to customers, and should be the lead-in statement on most messages.
- In the Tuesday, November 16 news release reference was made to restoring 25,000 customers. This figure does not agree with the figures in the NSPI report to the Board. Also, the peak number of outages reported in news releases does not agree with the peak outages reported to the Board in the January 18, 2005 report.
- The general tone of the messages appeared to Consultant to be negative, emphasizing too much the problems being faced and not stressing the actions taken and progress being made. The result was that the messages could be perceived as "We are overwhelmed!" There was a good bit said about progress in assessing damage, but very little said about progress in restoring power. For example, in a newspaper ad on Tuesday, November 16, NSPI stated that Monday was spent assessing damage and "We can now effectively deploy" the work

[18] "A Report to the Nova Scotia Utility and Review Board on Nova Scotia Power, Inc.'s Response to Hurricane Juan", April 8, 2004; Recommendation 23, page 30
[19] NSPI report to the Board on the November 13/14, 2004 storm, filed January 18, 2005, page 56
[20] NSPI response to Consultant's Information Request # IR-28

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crews.[21] Taken literally, this is telling the customers that three days into the restoration effort, NSPI was only now able to effectively deploy its resources! This was obviously not the case, as by this time almost 85% of the customers had been restored.

Details of the communications activities within NSPI and communications with provincial and municipal officials are covered in the January 18, 2005 report by NSPI to the Board in Section 3.8. These communications seemed to have served the intended purpose. The communications with provincial and municipal officials was something that was not done to any real extent during Hurricane Juan, and this is an important step in improving the overall NSPI communications effort. Communications with other external agencies is covered in Section V.c below.

Summarizing, NSPI has some opportunities for improvements in the quality of communications that they are putting out to their customers during major outage events. They have a good Communications Plan, their processes are well designed, but the execution can be improved. There are opportunities to put out meaningful restoration estimates earlier, and there are opportunities to do a better job in communicating the progress that is being made in restoring power.

RECOMMENDATION 3

Corporate Communications and the Regional Operations Coordinator should review the process for establishing restoration estimates with the goal of developing more specific estimates and communicating them externally within the first 24 hours of the onset of the storm.

RECOMMENDATION 4

NSPI should engage an outside communications consultant to review the communications during the November 13/14 storm and provide the training and direction to assist NSPI to improve the quality of their customer messages.

RECOMMENDATION 5

NSPI should review the process for determining peak customer outages and customers restored daily to be sure that information put out during the storm will agree with the final storm analysis.

[21] NSPI Storm Communications Book

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b. Communication with External Agencies

Details of NSPI activities in coordinating with external agencies are found in Section 3.14 of the January 18, 2005 NSPI report to the Board. Included among the "external agencies" were the Provincial Emergency Measures Organization (EMO), the Halifax EMO, and Community Services/Red Cross. NSPI reports that it made initial contact with both EMOs between 5:30 and 6:00 a.m. on Sunday, November 14. NSPI furnished 24 hour coverage in both EMO EOCs through Day 2 until the EMO EOCs ramped back to extended shift operation, and continued to provide a dedicated EMO liaison throughout the restoration effort.[22] NSPI provided Community Liaison Officers in coordination with the EMO to assist as Comfort Centres were activated in conjunction with the Community Services and Red Cross organization.[23]

In Consultant's April 8, 2004 report to the Board on Hurricane Juan, the following recommendation was made:

> "NSPI should hold discussions with EMO to clarify the specifics of the working relationships, needs, and expectations that each organization has for the other. Once this is finalized, NSPI should submit a written copy of this understanding to the NSUARB."[24]

As with other recommendations in Consultant's Hurricane Juan report, NSPI has made a good faith effort to comply with the intent of this recommendation. Due to time constraints and the need to make some progress before the peak of hurricane season, NSPI concentrated its efforts in its communications and coordination with the provincial EMO. Good progress has been made, but there is still more that needs to be done. Feedback received from this effort during the November 13/14 storm indicates there were some deficiencies in the quality and quantity of information available to the EMO EOCs through the NSPI Liaison Officer. Information such as specific outage data, restoration activities and estimated times of restoration for specific areas, restoration priorities, etc. was often not available when needed by the EMO EOC. Again, this is understandable given the fact that NSPI was still in the process of fully developing and implementing the processes for EMO coordination. Consultant is confident that NSPI will make the necessary improvements in these areas with more time to complete the roll out of these processes.

RECOMMENDATION 6

NSPI should aggressively pursue the completion of the work it has begun in developing coordination processes with the EMOs.

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[22] NSPI report to the Board on the November 13/14, 2004 storm, filed January 18, 2005; Section 3.14, p 45.
[23] Ibid, page 46
[24] "A Report to the Nova Scotia Utility and Review Board on Nova Scotia Power, Inc.'s Response to Hurricane Juan", April 8, 2004; Recommendation 38, page 41

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VI. Conclusion

As stated at the beginning of this report, the two largest power outage events in the history of NSPI have occurred within 14 months of each other. Obviously these questions arise:

- "Was NSPI better prepared for the second one?"
- "Did NSPI do a better job in responding to the second one?"
- "Has NSPI done anything with the Consultant's recommendations from the Hurricane Juan report?"

Despite some obvious problems with establishing early restoration estimates and with effective communications, the answer to all three of these questions is "Yes" in Consultant's opinion. Having worked with the NSPI team charged with the responsibility for developing and implementing the ESRP, and having worked with numerous key NSPI response team members on different recommendations and process improvements, Consultant is personally familiar with the dedication and enthusiasm which has marked the NSPI effort to make itself a better response organization.

As is expected in the case of any emergency response organization in responding to any emergency, there will always be areas of needed improvement. The number and substance of the improvement opportunities identified in this report are certainly not unreasonable, given the fact that NSPI began developing the new ESRP and the other processes just six months before the impact of the second largest outage event in its history. (It should be noted that Consultant did not address the performance of the Call Center or the call processing system, as this function is covered in another consultant's report.)

In summary, it is Consultant's opinion that NSPI did a good job in responding to this outage event. Their performance was impacted by the fact that they did not get a weather forecast that accurately predicted the actual conditions that were experienced. Beyond that, the biggest problem areas lie not in NSPI's actual performance, but in its communications with its customers and other key constituents.

There are definitely items for improvement as spelled out in the six recommendations. NSPI should take the necessary action to see that they capitalize on these opportunities for improvement.

Consultant appreciates the opportunity to work with the Board and with NSPI and submits this report in the sincere hope that it will benefit both – and most importantly the customers and other stakeholders of NSPI who are the most significantly impacted by such events.

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APPENDIX A
(See Page 5 of Report)
Resume Of Consultant's Experience

John E. Sherrod (hereafter referred to as "Consultant") is an electrical engineer with a Bachelor of Science degree from Mississippi State University. He retired in January, 2004 from Entergy Corporation after more than 41 years of experience in engineering and operations. Entergy Corporation, headquartered in New Orleans, LA, USA, serves 2.6 million retail electric distribution customers in four states – Louisiana, Mississippi, Arkansas, and Texas. Entergy is the fourth largest electric utility in the United States.

Consultant's primary areas of experience are in the general management of electric distribution operations, with special emphasis on major outage response. For six years Consultant held the position of Director, System Outage Response, with overall responsibility for Entergy's emergency preparedness and disaster recovery. This was a newly created position when Consultant assumed the role, and he was personally responsible for developing the emergency preparedness and disaster recovery processes, which have guided Entergy in their emergency response efforts since that time. In his role as "Storm Boss" during major outage events, Consultant has personally directed Entergy's emergency response activities for all major storms since 1998, including Hurricanes Georges, Isidore, and Lili, and several major ice storms and tornado/wind storms.

Under Consultant's leadership, Entergy was awarded the Edison Electric Institute's Emergency Response/Assistance Award the first six years the award was offered, the only utility in the nation so honored.

Consultant has been actively involved in some of the most devastating storms to hit the Southeastern United States. These include, but are not limited to, Hurricanes Hilda (1964), Betsy (1965), Camille (1969), Frederick, Andrew (1992), Georges (1998), Floyd and Irene (1999), Isidore and Lili (2002), and Isabel (2003), ice storms of 1989, 1994, 1997, 2000, and 2002, as well as numerous severe tornadic wind storms.

Consultant performed a review of Nova Scotia Power Inc's response to Hurricane Juan and issued a report to the Nova Scotia Utility and Review Board in April of 2004. Following the devastating 2004 hurricane season which saw five tropical systems hit the state of Florida, Consultant was engaged by the Edison Electric Institute (EEI) to work with utilities across the United States in improving the mutual assistance process among utilities.

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Recommendation	Status as of November 13, 2004	Experience During November 13/14 Winter Storm
1. Emergency Plan - Specific Details	Revised Emergency Services Restoration Plan (ESRP) filed with the Board on August 13, 2004. In addition to the ESRP, a Logistics and Communication Plan were developed and filed with the UARB as supporting documents. The general framework of NSPI's restoration planning is a corporate level ESRP with sub-plans for specific functional areas – i.e., Customer Coordinator, Logistics Coordinator, Regional Operations and Communications.	Used as storm plan to guide restoration efforts.
2. Annual Storm Drill	The revised ESRP provides for an annual drill, with the understanding that implementation of the ESRP in response to an actual major storm could fulfill this requirement. The ESRP also provides for additional tabletop drills to be conducted on an as-needed basis. Consultant assisted NSPI in conducting an internal review workshop on September 16, 2004 in which participants were presented with a major storm scenario and responded by discussing their roles and responsibilities as outlined in the ESRP. Consultant has worked with a designated NSPI Drill Design Team from September through mid-November 2004 designing a simulated drill originally scheduled to be held on December 8, 2004. Plans for this drill were cancelled following the winter storm which hit Nova Scotia on November 14, 2004. The preparation for the drill to date has provided a good foundation for the drill process, and will help facilitate a timely and effective drill design and preparation process with the next drill scheduled for the 2nd quarter of 2005.	N/A

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3. Private Weather Provider	As reported by Consultant in the September 30, 2004 status report, agreement was reached that NSPI would proceed for the time being with Environment Canada as their sole provider, with the understanding that this issue would be addressed later as more experience is gained with major weather events and the revised ESRP.	Environment Canada was only weather source during the November 13/14 storm.Based on experiences during November 13/14 storm, NSPI should aggressively pursue an additional weather provider.
4. Event Prediction Model/Process	The ESRP provides for an event prediction process described as "a combined knowledge base and database tool that utilizes past storm experience to predict, in advance, both the geographical extent and magnitude of the event." By its very nature, such a tool becomes more effective with the amount of data obtained through actual events. NSPI has developed an Event Prediction Model and Event Monitoring Process which have been utilized since late September, 2004.	This new model/process was utilized during the November 13/14 storm to help predict potential impact and establish plans to respond.
5. Activation Timeline	The revised ESRP provides a comprehensive Event Timeline. NSPI has followed this timeline in smaller events and major storm threats that have occurred since the revision of the ESRP.	The timeline was followed during the November 13/14 storm.
6. Corporate Command Team Org.	The revised ESRP provides a comprehensive description of the corporate command team organization for different levels of major outage events. NSPI has activated parts of this organization in smaller events and threats that have occurred since the revision of the ESRP.	Corporate Command Team was activated during the November 13/14 storm

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7. Corporate Command Center Facility	A new corporate command center facility has been built at the Ragged Lake facility and is ready for use.	The Ragged Lake EOC was activated and utilized during the response to this storm.
8. Aggressive Recruitment of Outside Resources	NSPI has adopted a more proactive approach to recruitment of outside resources while at the same time closely managing this to make sure decisions are prudent and risk of unnecessary expenditures is minimized. The event prediction process and additional mutual assistance networking by NSPI help facilitate this more proactive and closely managed recruitment process.	NSPI proactively and aggressively recruited, secured and deployed outside resources very effectively in the November 13/14 storm.
9. Early Recruitment/Arrival of Outside Resources	The ESRP provides for early recruitment and arrival of outside resources. Improvements to the damage assessment process and advance planning for staging sites and early deployment of resources are included in the plan.	See above comments.
10.Mutual Assistance Coordinator Report To Storm Leader	The ESRP provides for External Resource Coordinator to report directly to Storm Team Lead 4 in a Level 4 event, and through the Asset Management Coordinator to Storm Team Lead 3 in a Level 3 event.	Mutual Assistance Coordinator was in place at the Corporate EOC.
11.Formation of Sub Regions	The ESRP restoration organization charts provide the organizational structure to set up sub region operations within existing regions. Further, the Regional Operations Sub Plan details the Geographic Based Restoration Philosophy. According to this plan, the four existing regions can be broken down into 10 smaller "subregional restoration nodes."	NSPI established a three node Regional Operations response structure according to the ESRP.
12.Specifics on Conference Calls	The ESRP sets forth specifics on teleconferences in the Communications Protocols Section. Items such as participants, schedule, and agenda are addressed in this section.	Conference call protocols were followed in all calls.

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13.Specific Status Report Formats	The ESRP adequately addresses the procedure for restoration status reporting and provides a Restoration Status Report form.	Status report formats were followed.
14.Additional Personnel As Scopers	The ESRP provides details of the damage assessment (scoping) organization and the procedure for mobilization of the amount of scopers needed, based on the severity of the event.	Scoping organization and procedures were followed in the storm.
15.Streamline Scoping Process	The ESRP contains a section dealing with Damage Assessment Coordination and Procedures that addresses the concerns raised in this recommendation.	New processes utilized during November 13/14 storm.
16.Upgrade OMS, Improve Utilization of OM Process	NSPI has completed the OMS application and system performance modifications. A storm simulator has been developed and training delivered. Restoration process training has been developed and rollout commenced. OMS connectivity process has been developed to support large scale restoration events – i.e., dedicated resources are provided to update and maintain the status of the connectivity model. This allows an accurate customer outage count and development of restoration crew work packages based on trouble reports.	OMS was utilized during November 13/14 storm to assist in restoration response. Each node was assigned a coordinator, and NSPI reports good results.
17.Establish Database of Retired/Active Employees	Section 15.2 of the ESRP describes the requirement for annual review and listing of key roles. Appendix 1 of the ESRP – Resources List – provides the names of active and retired employees along with specific contact information and storm role assignments.	This was not a significant issue in the November 13/14 storm.
18.Corporate Communications Report Directly to Storm Leader	The ESRP specifies that the Corporate Communications Coordinator will report directly to the Storm Lead in Level 3 and 4 emergency restoration efforts.	Corporate Communications Coordinator reported directly to Storm Lead at EOC.

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19.Activate Corporate Communications Team w/ Corporate Command Team	The ESRP provides that the Corporate Communications Team will be activated at the same time as the Corporate Command Team, and their advance preparation steps are designed to coordinate with those of the other functions represented on the Corporate Command Team.	Team was activated at same time as Corporate Command Team
20.Specific Major Storm Communications Plan	NSPI filed with the Board the "Emergency Services Restoration Level 3 & 4 Response Communications Plan" which provides detailed guidelines for communications activities during a major storm outage event.	Plan was in place and was followed. As noted in report, some improvements are needed in execution.
21.Review of All Messages by Corp Command Team	This process is included in the Communications Plan filed with the Board.	This process was followed. As noted in report, some improvements are needed in execution.
22.Follow Up to Correct Misleading Media Reports	This process is included in the Communications Plan filed with the Board.	This process was followed.
23.Furnish Specific Restoration Estimates	This process is included on pages 13 and 15 in the Communications Plan filed with the Board.	NSPI developed restoration estimates and communicated them, but there is a need to get them out earlier

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24.Plan for Updating Information to Phone Agents	This process is now documented in the Communications Plan and has been utilized during several events which occurred during recent months.	This process was followed. Opportunity for improvement exists with earlier restoration estimates.
25.Community Liaison Team	This process is detailed in the Communications Plan on pages 10 and 11 dealing with Community Liaison.	Community Liaison representatives were assigned to Red Cross Comfort Centres.
26.Customer Information Centers	This process is now documented in the Communications plan and will be utilized in conjunction with the EMO in those circumstances which require this type of customer contact.	See comments above.
27.Post-Event Customer Perception Surveys	The Communications Plan, on page 16, provides for a post-event customer perception survey to be conducted after all Level 4 outage events, and after Level 3 events as deemed necessary.	Post event surveys were conducted following the November 13/14 storm.
28.Improve Call Processing System	The existing High Volume Call Answering (HVCA) system utilized by NSPI is custom-built for them. Inherent to this system is the requirement that the caller indicate a desire to remain on hold, and after three attempts to find a vacant slot in the Interactive Voice Response (IVR) system, the caller will be dropped. This is by design, and to change it will require a significant system re-design which will be quite costly. To address this, NSPI has also developed a more "caller-friendly" message to advise callers that because of heavy call volume and lack of available slots in the IVR that their call is being terminated. Although this still could create adverse customer reaction, Consultant is of the opinion that the course NSPI is following at this time will help minimize this inconvenience. NSPI	The problems with the performance of the call processing system were a major factor in customer dissatisfaction with the NSPI response to the November storm. There are significant improvements needed here, including a new call processing system.

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	has entered into an arrangement to route overflow calls to other call centers, and they are exploring with Bangor Hydro and Aliant the ability to network call centres and add trunk lines. This is in conjunction with Recommendation 31. Again, this could be quite costly. Consultant considers the action that NSPI has taken in addressing this recommendation to be appropriate at this time, subject to more experience with the system in future major outages.	(NOTE: See report by Liberty consulting group on specifics in this area.)
29.Corporate Communications, Call Center Coordinate Info to Agents	This process is now documented in the Customer and Communications Sub-Plans and has been utilized during several events which occurred during recent months.	This process was followed, but there were numerous customer complaints about lack of good information. More work is needed here.
30.Call Center Performance Reporting	This update is described in the ESRP and the process is documented in the Customer SubPlan and has been utilized during several events which occurred during recent months. Specific details have been integrated into Call Centre Lead responsibilities as detailed in the plan.	This process was followed; see comments above about problems with lack of good information to customers.
31.More Trunk Lines and/or Outsourcing of Calls	NSPI has entered into an arrangement to route overflow calls to other call centers, and they are exploring with Bangor Hydro and Aliant the ability to network call centres and add trunk lines.	Calls were redirected from HSPI HVCA hold queue to Aliant call center in Newfoundland. See earlier comments about overall problems with call processing.

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32.System Safety Coordinator	This position has been established and the ESRP details the organizational reporting arrangement and responsibilities of this new position.	This position was activated during the storm, and the safety performance was very good.
33.Safety Specialists in Impacted Areas	These specialist positions have been included in the response organization as shown in the ESRP.	These positions were activated during the storm, and the safety performance was very good.
34.Org Chart for Line Repair and Forestry Management	The ESRP includes an organization chart detailing the line repair and forestry management functions. Further, details of the distribution restoration line repair and forestry management processes are addressed in the Regional Operations Sub Plan.	This organization and the associated processes were utilized during the storm.
35."Stand Alone" Storm Teams	The ESRP states that NSPI is seeking to establish a standardized complement for mutual assistance requests between NSPI and mutual assistance allies. This standardized complement contemplated is the "Stand Alone" Storm Team concept. The NSPI restoration plan at the regional level is now built around this concept.	This concept was used in the storm with good results.
36.Designate Employees Assigned to EMO's	The ESRP designates specific assignments at the EMO.	Employees were assigned to the Provincial and HRM EMO's. Comments received indicate there are still opportunities for improvement here.

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37.Work with EMO on List of Priority Issues	NSPI has been actively engaged in meetings with provincial EMO to develop a current priority restoration list for each operating area.	Priority restoration lists were available for use in this storm. Comments received indicate there are still opportunities for improvement here.
38.Clarify Relationship Between NSPI and EMO	Meetings between NSPI and EMO have been ongoing with the objective of strengthening and clarifying the relationship.	Comments received indicate there are still opportunities for improvement here.
39.Planning Sessions with Armed Forces	Based on review with the provincial EMO, it has been confirmed that all potential assistance from Armed Forces will come through the EMO. Therefore, NSPI will work with EMO on planning the recruitment, deployment, and utilization of Armed Forces personnel in future events.	Armed Forces personnel were not utilized by NSPI in this event.
40.Bring in Enough Forestry Crew Help	NSPI has adopted a more proactive recruitment of outside resources while at the same time closely managing this to make sure decisions are prudent and risk of unnecessary expenditures is minimized. The event prediction process and additional mutual assistance networking by NSPI help facilitate this more proactive and closely managed recruitment process. The ESRP provides for early recruitment and arrival of outside resources. Improvements to the damage assessment process and advance planning for staging sites and early deployment of resources are included in the plan.	NSPI proactively and aggressively recruited, secured and deployed outside resources very effectively in the November 13/14 storm.

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41.Move Some of Switching Process Out Into Field	NSPI is concerned over being able to do this safely, and states that the present procedure did not cause any delays during the Juan restoration. Consultant is of the opinion that this recommendation should not be pursued at this time. The performance of the switching process in future major events should be reviewed to confirm that this present procedure is in fact the best alternative. Appendix 7 of the ESRP includes a review of the Standard Protection Code which addresses this recommendation. The review includes both related safety incidents and resource effectiveness.	This process worked well as described, with no resultant delays as a result of following these procedures.
42.Storm Teams Complete All Work in Area	Section 2 of the ESRP contains the following statement and the Regional Operations Sub Plan is structured around storm teams and this philosophy: As a practice, restoration crews will endeavor to repair individual customer services (homes and business) in an assigned area after street side supplies have been restored and provided the service masts are intact and safe to connect.	This process was followed successfully in this event.
43.Establish Work Schedules in Advance	This concept is now covered in the ESRP and is also specifically addressed in the Regional Operations Sub Plan.	Work schedules were established in advance according to the ESRP.
44.Comprehensive, Proactive Logistics Plan	NSPI has developed a new Logistics Plan that addresses the specifics of an effective logistics effort in a major outage event. This plan was filed with the Board, along with the ESRP, on August 13, 2004.	Logistics Plan worked well. No delays encountered due to logistics.
45.Review Materials and Transportation Management Plans	This review has been completed and a comprehensive Logistics Sub Plan has been developed, which includes Materials Management and Transportation Management.	Materials and Transportation support worked well during the event.

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APPENDIX B

46 Guidelines: Post-Event Critique, Follow-Up	The post-event critique guidelines are included in the ESRP in Section 15.4 and will be followed for all future major outage events. These guidelines also cover action plan development.	NSPI conducted a post-event critique according to the ESRP.
47.Report Status of "JUAN Recommendations"	This document– Recommendations Matrix – provides a status report and will be used by NSPI in its quarterly meetings with the Board. Further review of the adequacy of this document format will be made in conjunction with these quarterly meetings.	This reporting is being done by NSPI on an ongoing basis.
48.Corporate Philosophy: Costs vs. Other Factors	NSPI states that their corporate philosophy is to seek to balance customer restoration and service levels with prudent cost management. It is Consultant's opinion that this statement accurately describes the NSPI corporate philosophy and this philosophy is reflected in the revised ESRP and the other actions taken by NSPI in response to Consultant's April 8, 2004 report on Hurricane Juan.	The NSPI restoration effort balanced the twin concerns of cost of restoration vs. speed and effectiveness.
49.Format Major Outage Report To NSUARB	NSPI provided a format for a major outage report to Board staff in September, 2004. Further review of the adequacy of this format will be made based on experience with actual events.	No final resolution reached at this time on format of this report. This needs to be resolved.

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APPENDIX C

REPORT RECOMMENDATIONS

RECOMMENDATION 1 (See page 7 of report.)

NSPI should carefully review the causes of the increase in their average interruption duration over the past ten years in light of their permanent PLT staffing reduction and advise the Board of their findings and plans to address this interruption duration increase.

RECOMMENDATION 2 (See page 10 of report.)

NSPI should actively seek a contract with a private weather service provider, to be used in conjunction with their present arrangement with Environment Canada.

RECOMMENDATION 3 (See page 19 of report.)

Corporate Communications and the Regional Operations Coordinator should review the process for establishing restoration estimates with the goal of developing more specific estimates and communicating them externally within the first 24 hours of the onset of the storm.

RECOMMENDATION 4 (See page 20 of report.)

NSPI should engage an outside communications consultant to review the communications during the November 13/14 and provide the training and direction to assist NSPI to improve the quality of their customer messages.

RECOMMENDATION 5 (See page 20 of report.)

NSPI should review the process for determining peak customer outages and customers restored daily to be sure that information put out during the storm will agree with the final storm analysis.

RECOMMENDATION 6 (See page 21 of report.)

NSPI should aggressively pursue the completion of the work it has begun in developing coordination processes with the EMOs.

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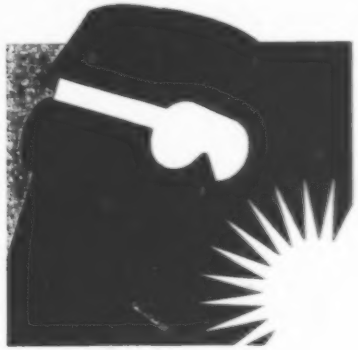
OFFSHORE/ONSHORE TECHNOLOGIES ASSOCIATION OF NOVA SCOTIA

FUTURE OF THE OIL & GAS INDUSTRY

THE NEWS HEADLINES

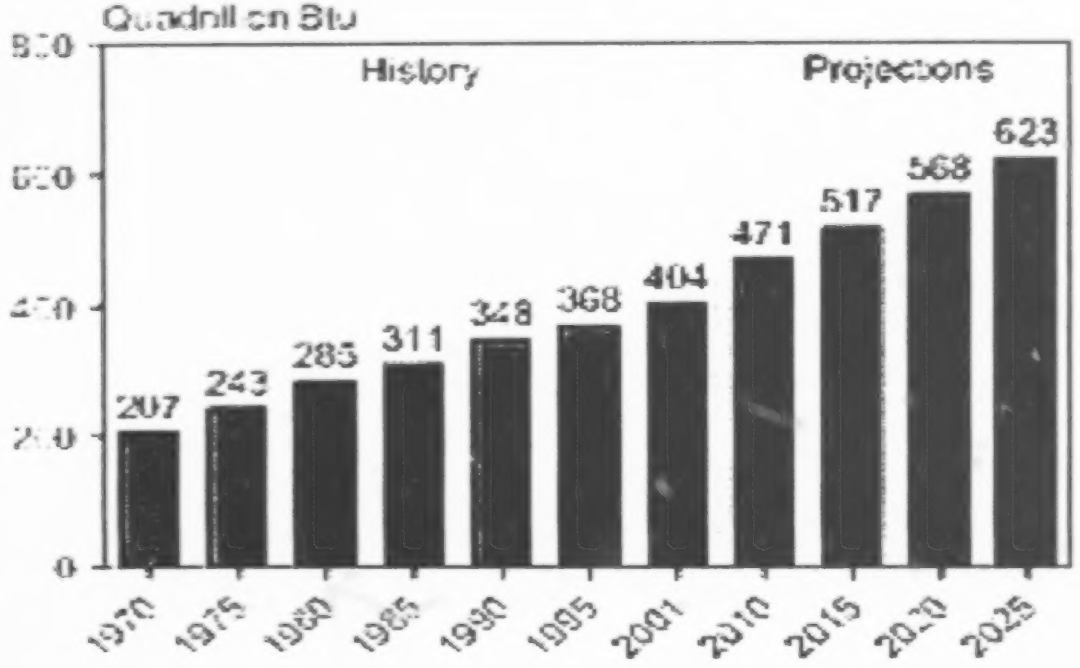
- $50 USD
- One dollar (CAD) / Liter
- Energy Blackouts
- Why ?
- *G 7 direction*
- Central Bank
- IMF reality

DEMAND



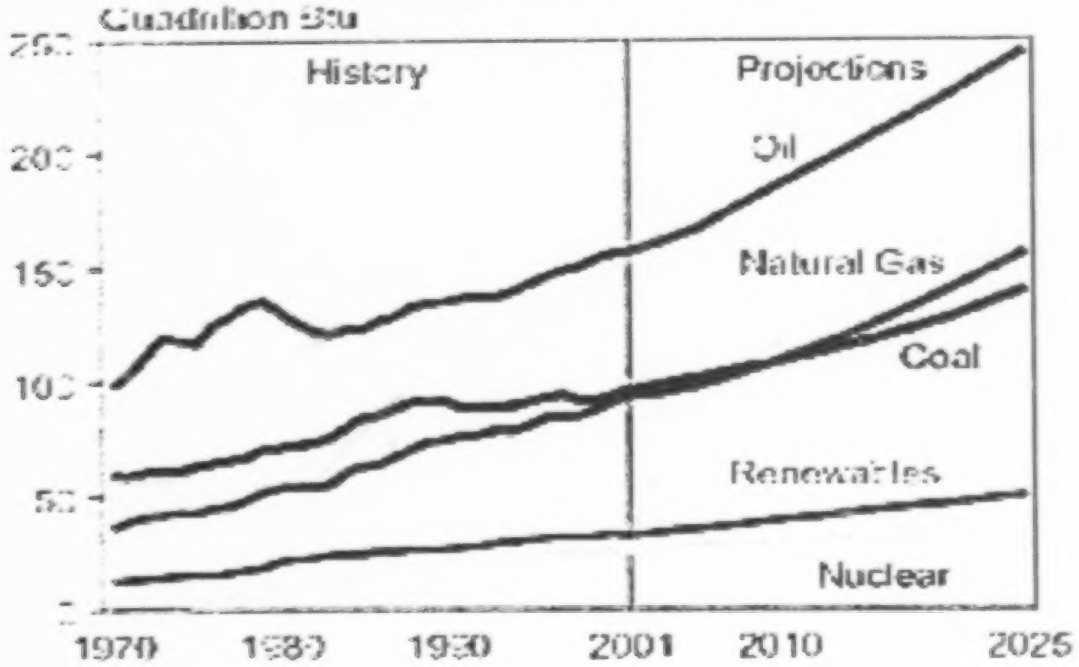
- Supply Side Economics
- Growth of “other markets”
- India, China ……..Mexico?
- North Sea declines
- Incr. from Caribbean, N Africa, Middle East, Canada
- Most important energy (Oil / Gas)
- Global Consumption 82 to 121 M. B. per day !!!!!
- No more quick WINS

World Marketed Energy Consumption, 1970-2025



OIL in 2025

World Marketed Energy Consumption by Energy Source, 1970-2025



SUPPLY

- Do we have enough? (3 Trillion)
- Where will the "shortfall" come from?
- Arab Nations (hidden reserves)
- Promising news

Other Influences

- Technology
- Mergers / Alliances / Partnerships
- New Players
- New Fields
- New Risks
- What do you see or forecast in your MARKET?

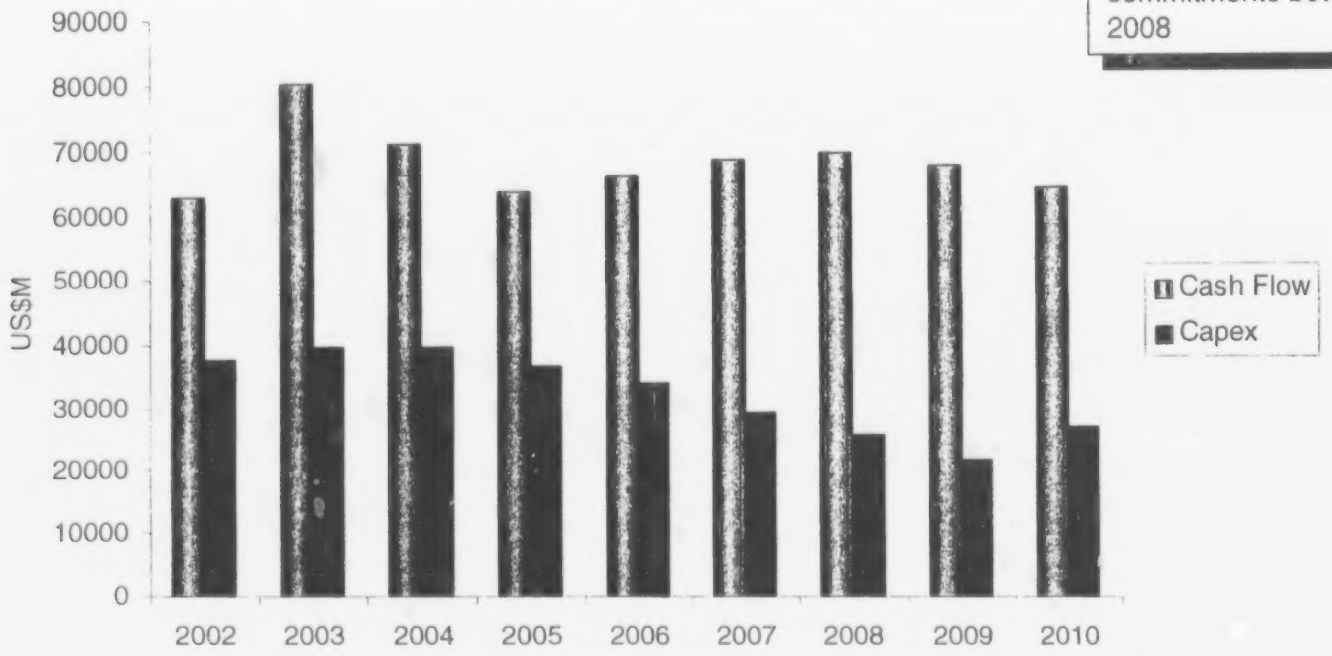
- >>>>>>>>>OIL & GAS INDUSTRY Prospects (CK)

Oil & Gas Industry Prospects

- Strong cash flow
- Reserve replacement
- Exploration trends
- Commercialisation of discovered reserves
- Production trends
- National Oil companies
- Some conclusions

Cash Flow will be strong

Large players will generate an aggregate of $175 bn dollars after meeting capex and exploration commitments between 2004 and 2008

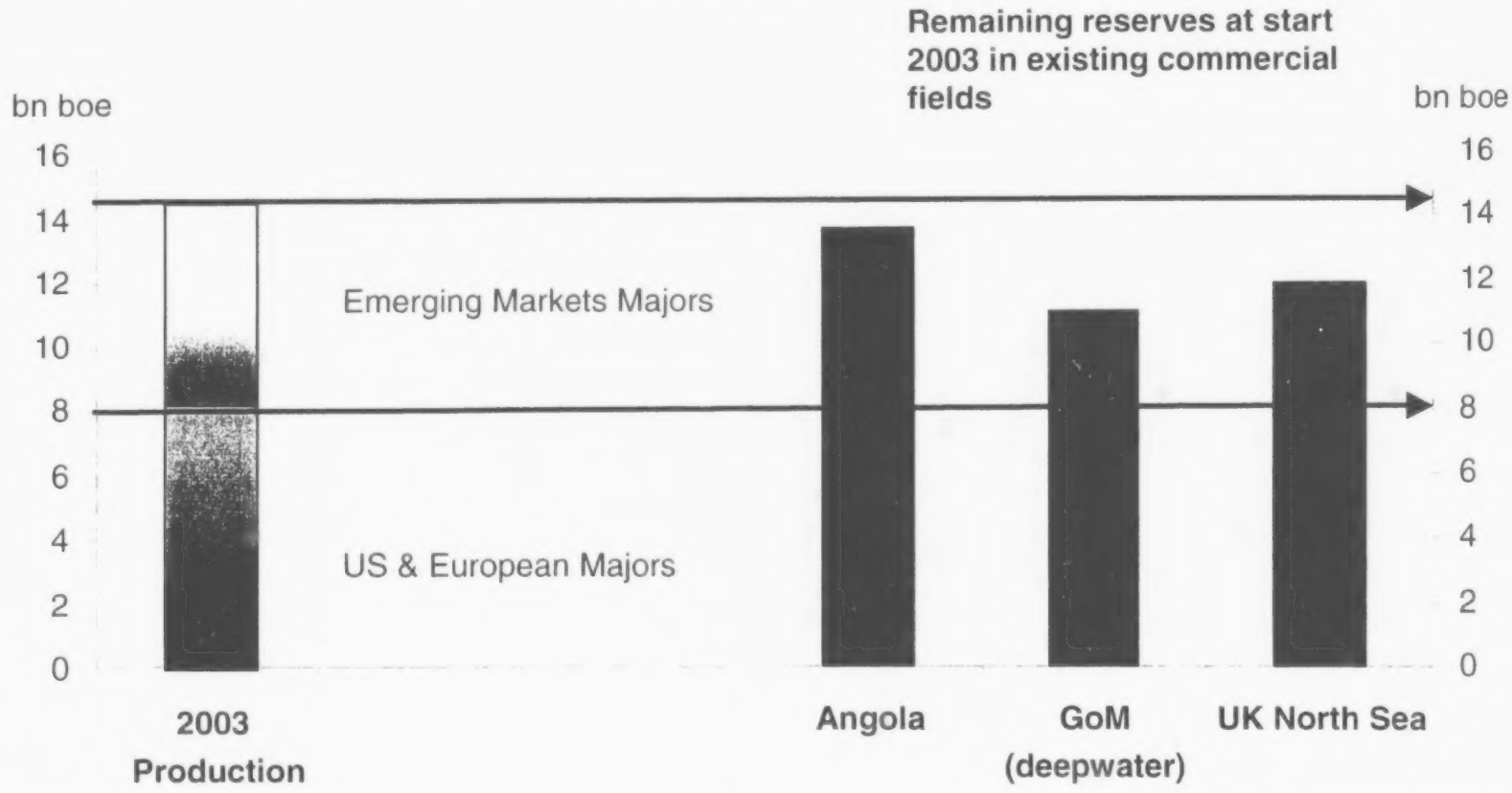


Wood Mackenzie's estimate of cash flow from upstream operations after tax and before financing, Wood Mackenzie capex forecast for planned commercial developments, exploration spend based on 2002 levels
ExxonMobil, BP, Shell, Total, ChevronTexaco, ConocoPhillips

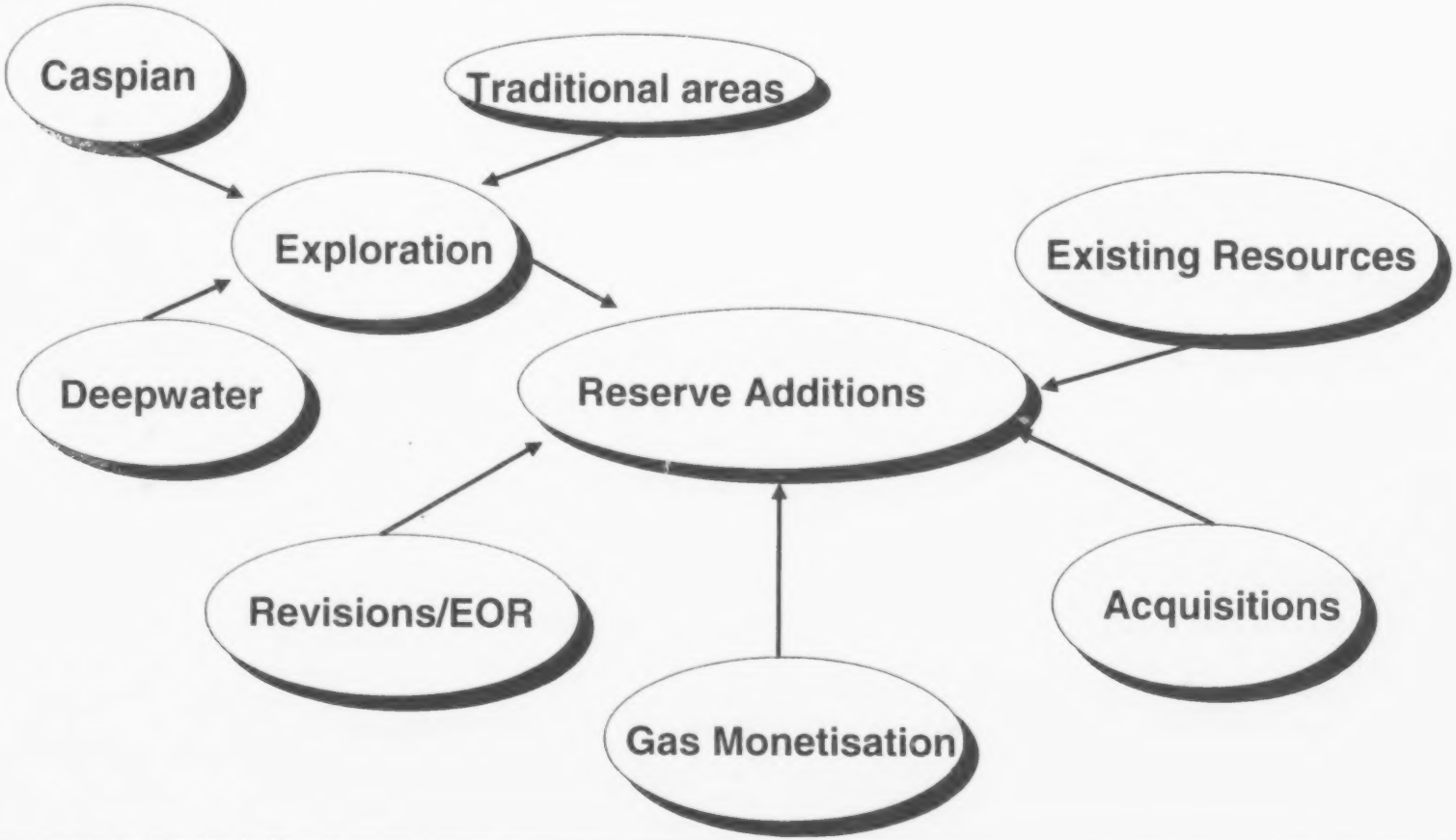
What will industry spend its money on?

- **Strategic allocations of large amounts of capital to large projects**
  - TNK-BP
  - Sakhalin II (Shell)
  - Qatar LNG (ExxonMobil)
- **Increased spending focused on Global LNG, Deepwater, Caspian**
- **Increase in share buy-backs/dividends**
  - major repayments of capital signalled by BP at prices over $20/bbl
- **Potential for strategic acquisitions on price weakness**
- **Limited scope for increased exploration spend**

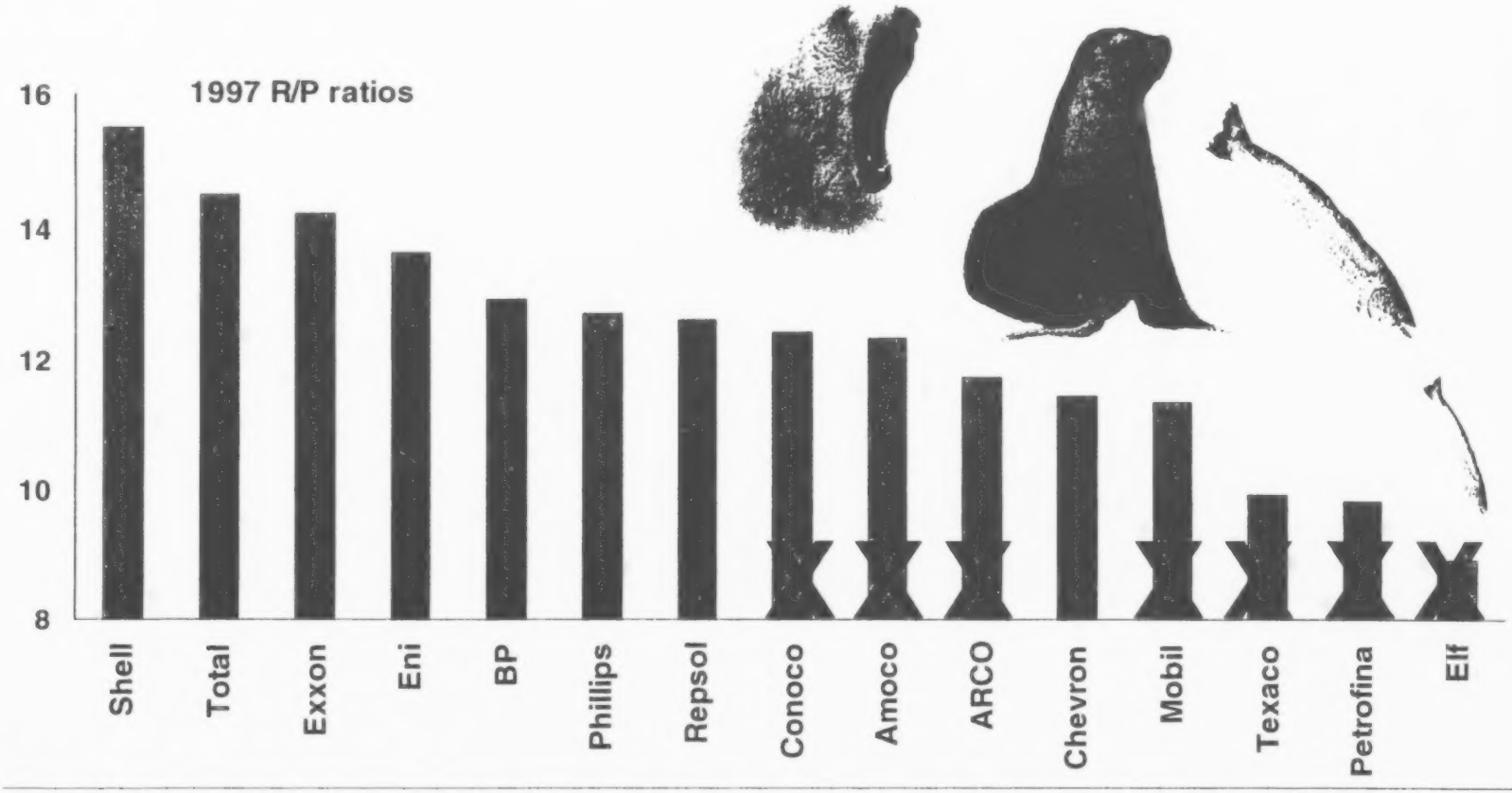
Reserves replacement - the majors alone need to replace a Gulf of Mexico deepwater every year



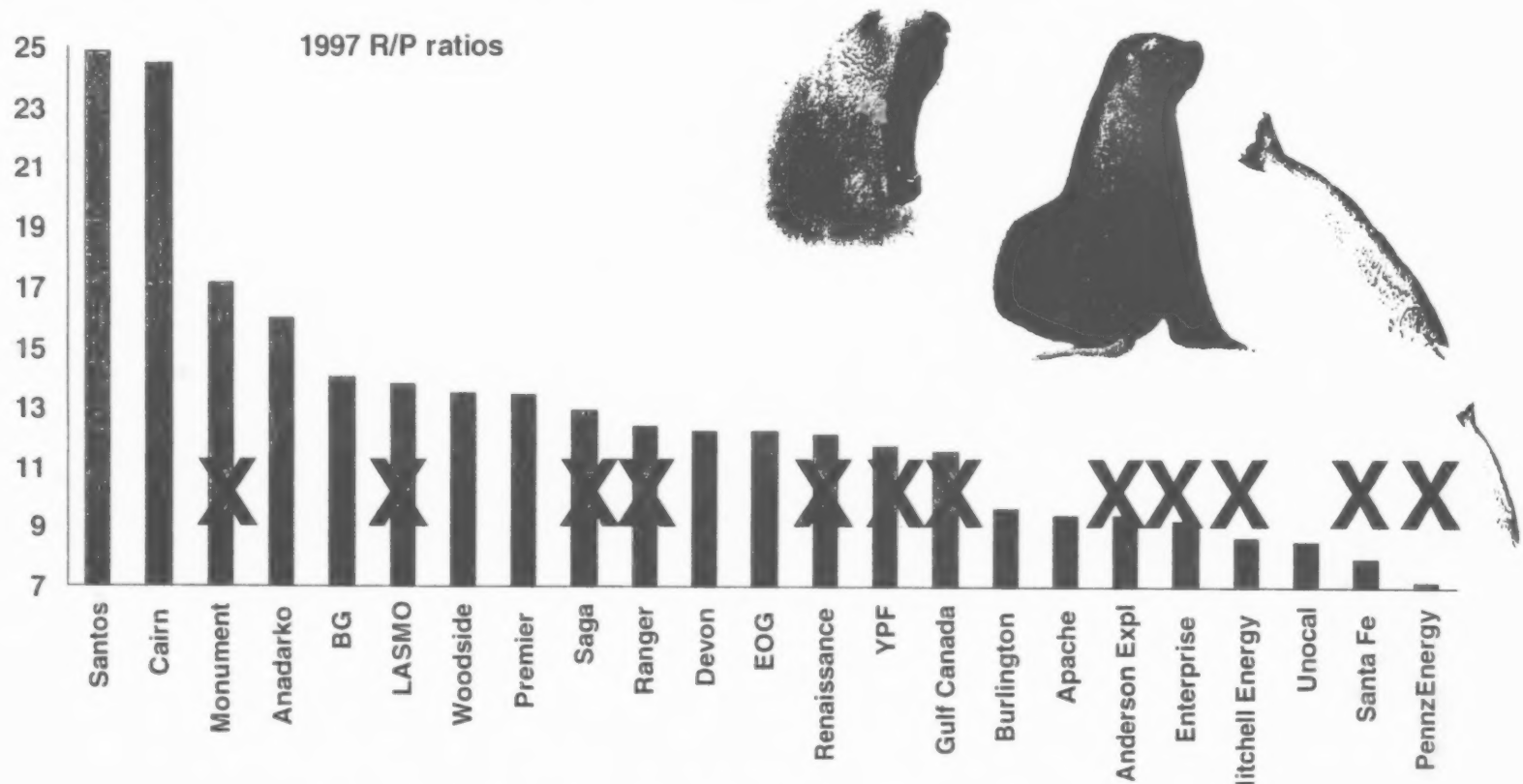
Building the Resource Base



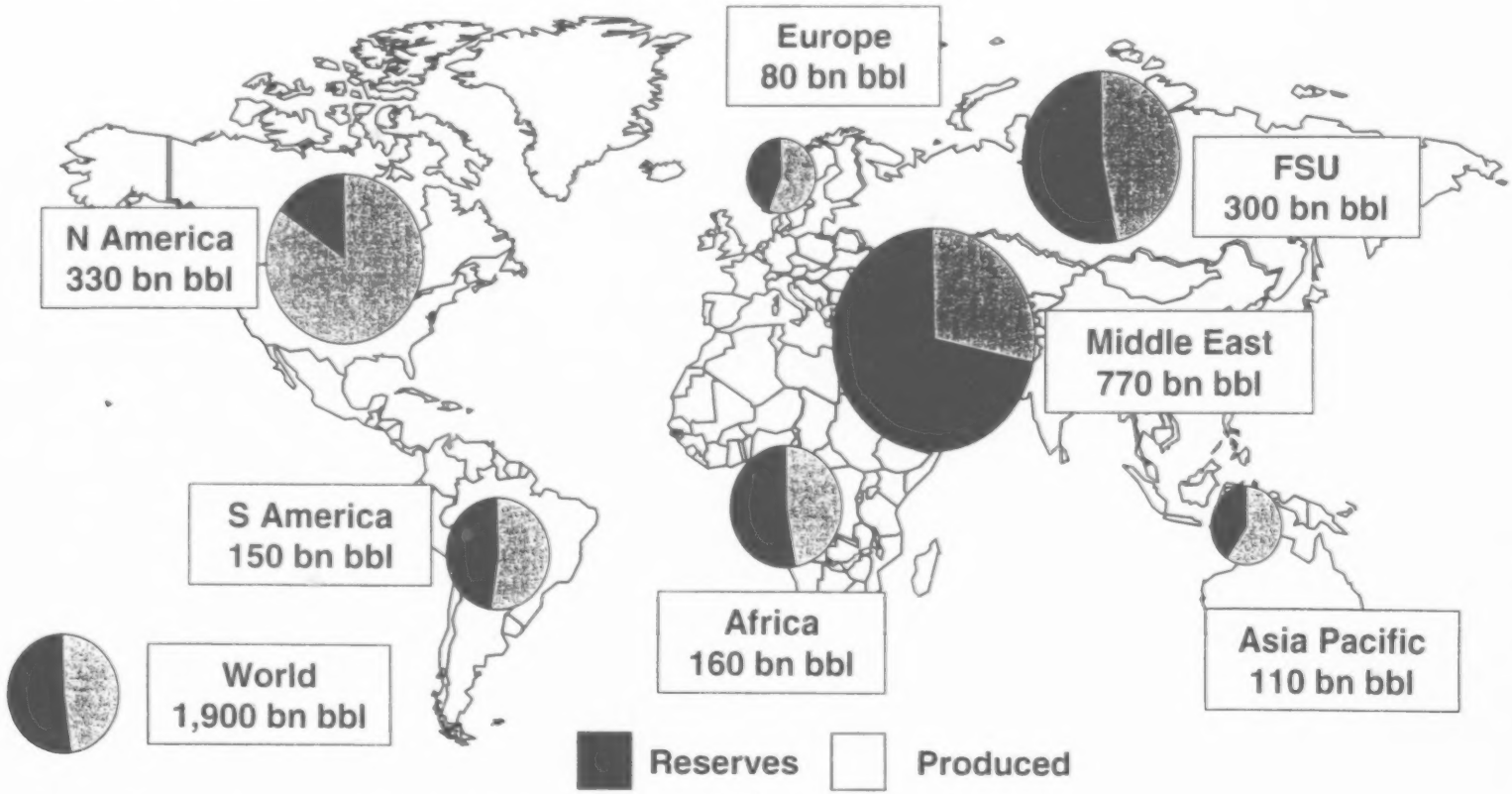
Not all companies have been able to grow - look at the fate of the majors that did not add reserves ...



The E&P sector has seen a similar rationalisation of those companies who were unable to build reserves



How much conventional oil does the world have - already produced, discovered or yet-to-find

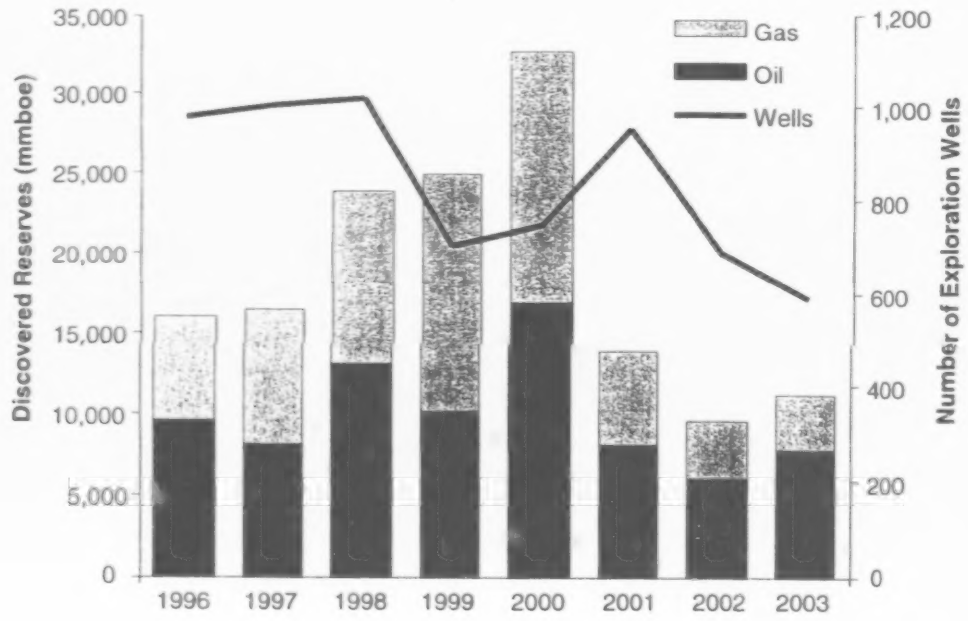


Source: BP Other estimates: USGS 2,700 bn bbl, Robertson 1,400 bn bbl

CHC

There is less exploration happening....

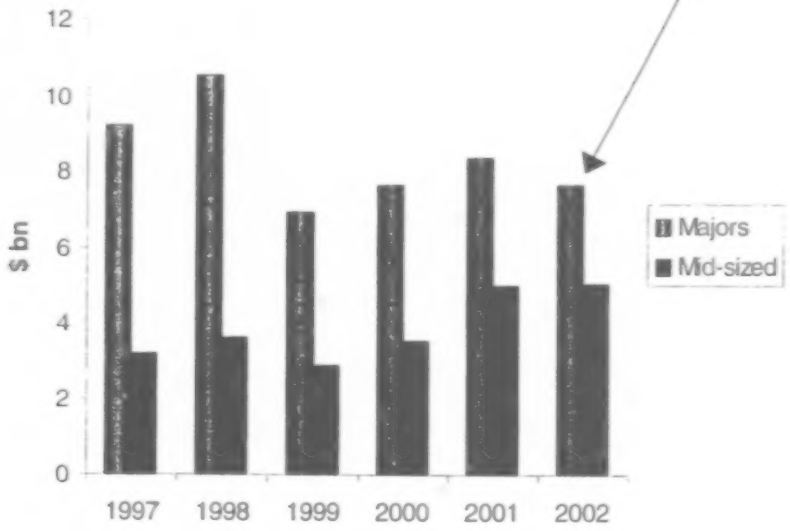
- Activity and investment fell in 1999 and has not recovered
- Yet - discovered oil volumes are holding up
- Some metrics look OK - eg success rates and finding costs have been flat



Exploration Expenditure

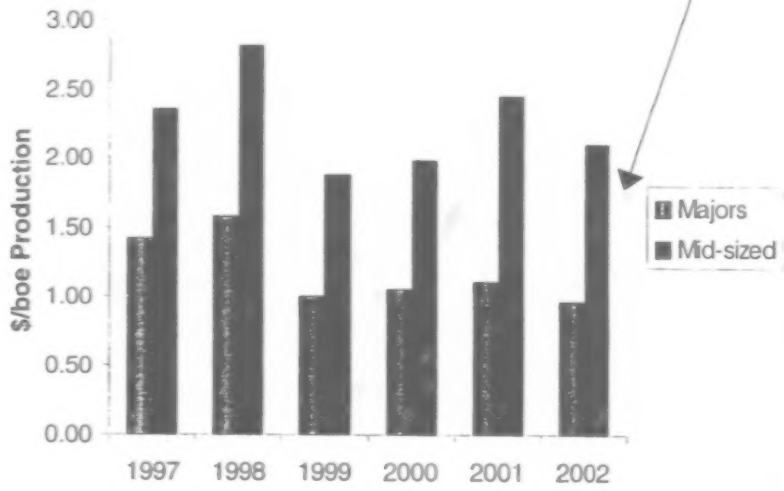
The majors have continued to constrain exploration expenditure.

Exploration Costs Incurred



The mid-sized oil companies are investing in exploration at twice the relative rate of the Majors.

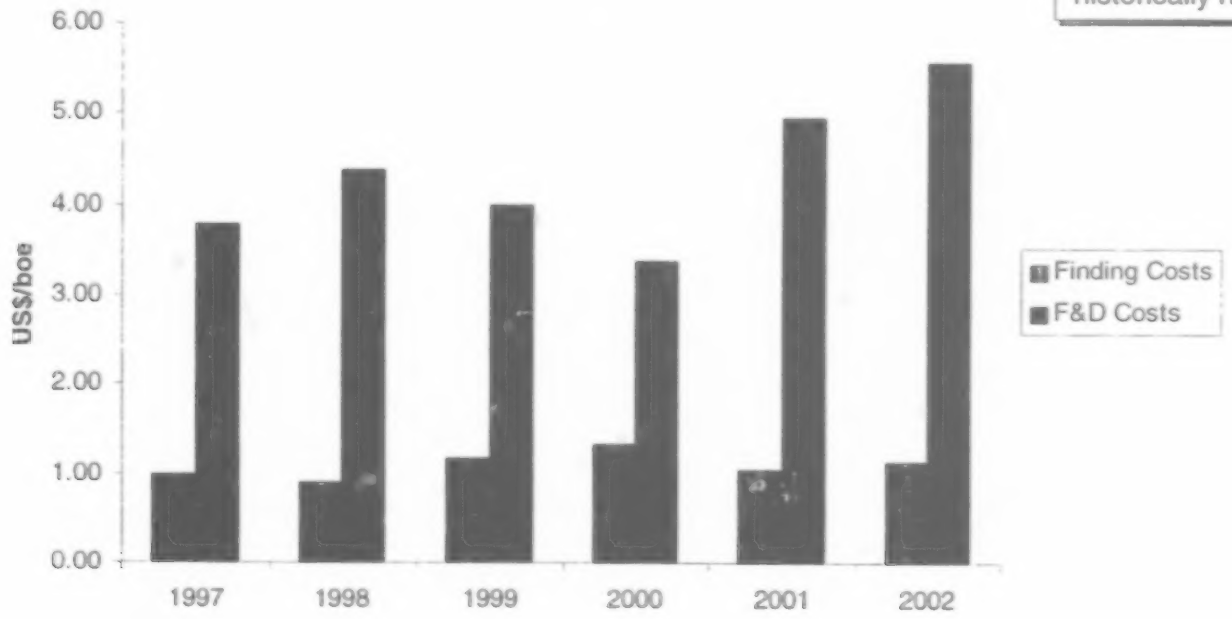
Investment Rate



Majors: BG, BP, ConocoPhillips, ChevronTexaco, Eni, ExxonMobil, Repsol-YPF, Shell, Statoil and Total
Mid-sized: Amerada Hess, Anadarko, Apache, BHP Billiton, BG, Burlington, Devon Energy, Encana, Kerr McGee, Marathon, Norsk Hydro, Occidental, PetroCanada,Unocal

SEC Finding and F&D costs

Finding costs have remained flat but development costs have risen driven by historically high capex levels



Source SEC reserve bookings 1997-2002, ExxonMobil, Shell, BP, ChevronTexaco, Total, Eni, Repsol-YPF, ConocoPhillips, Statoil, BG

Recent exploration performance

How did the top 25 companies exploration results compare over a recent seven year period?

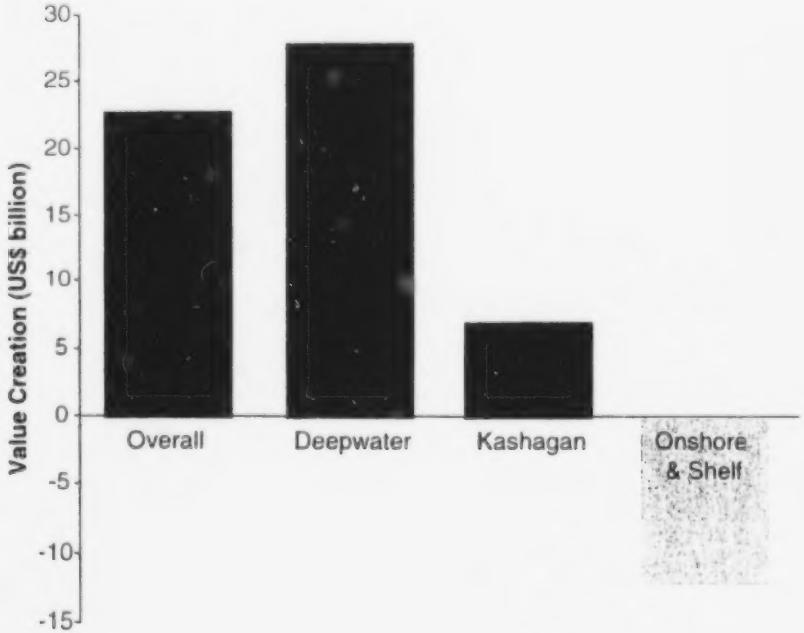
- **Value Creation**

Value of Discoveries*	>	Exploration Spend*

- **This calculation made for each of the 25 companies in nearly 80 countries**

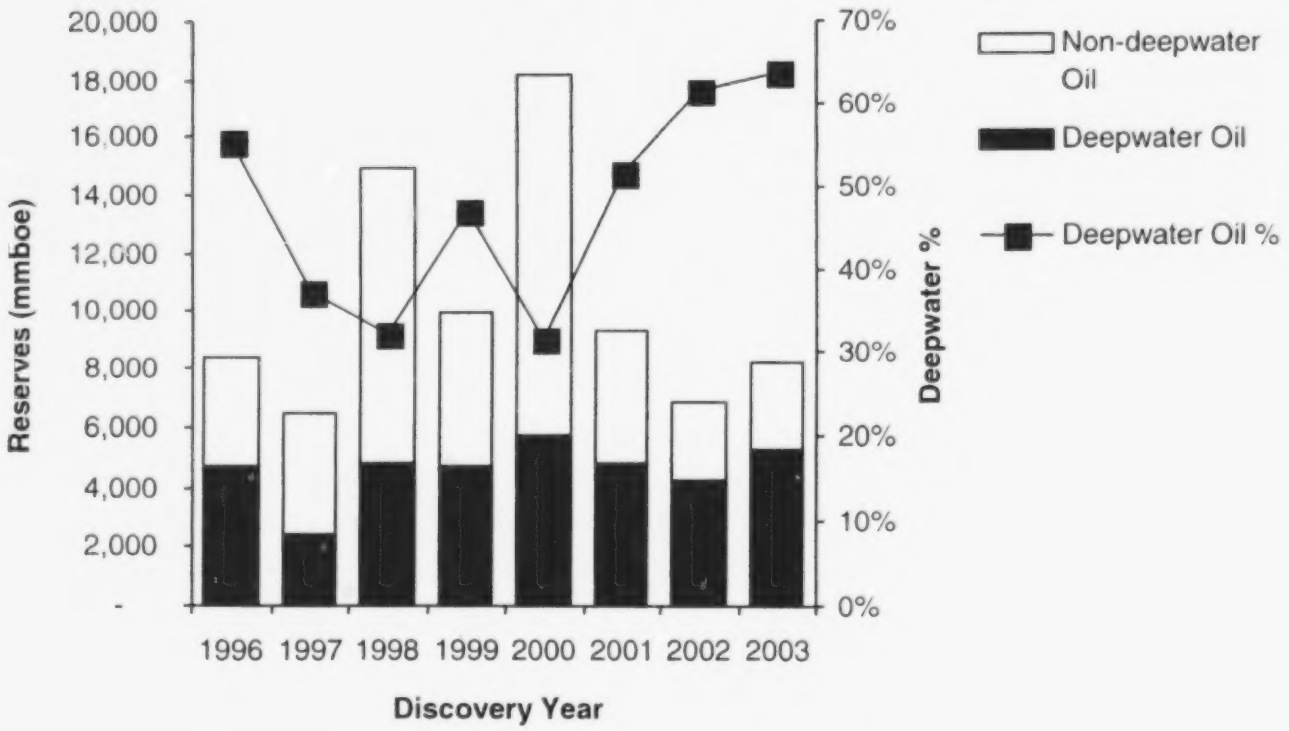
* Both spend and discoveries PV are discounted at 10% nominal to a common date, and adjusted for asset disposals & other factors

The winners explored in the right places

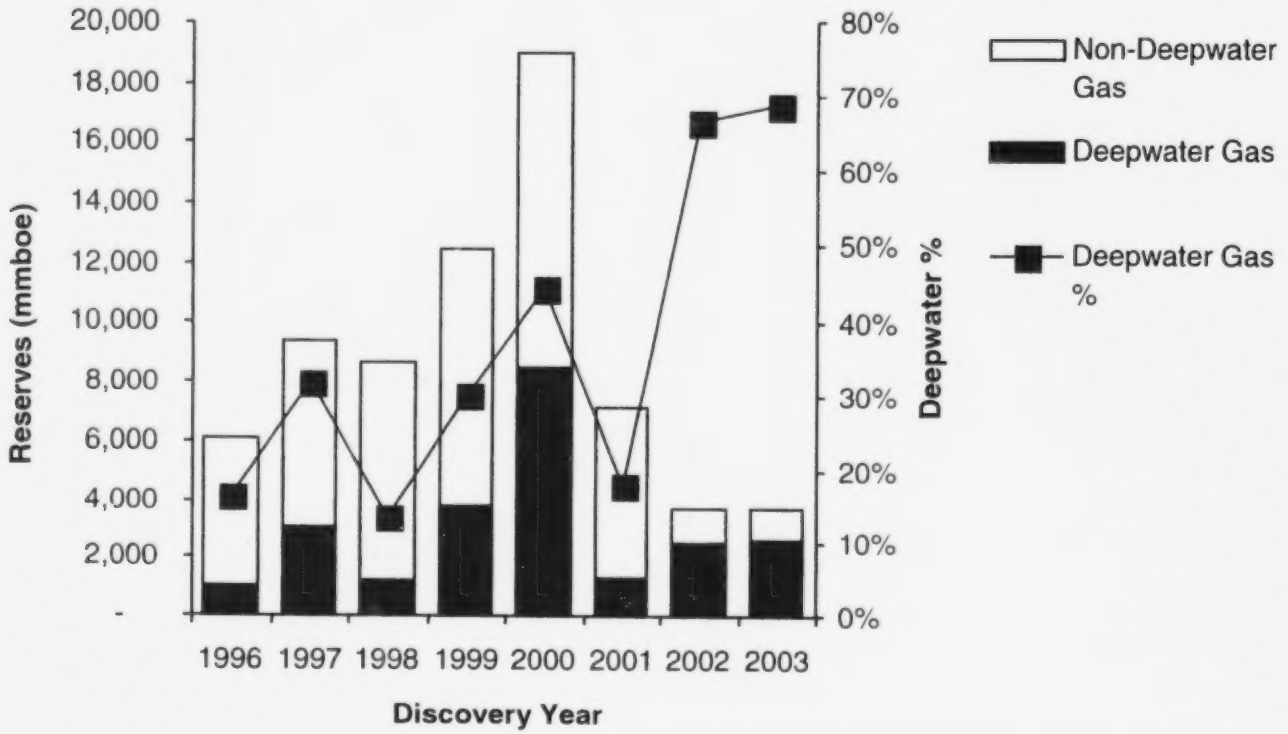


CHC

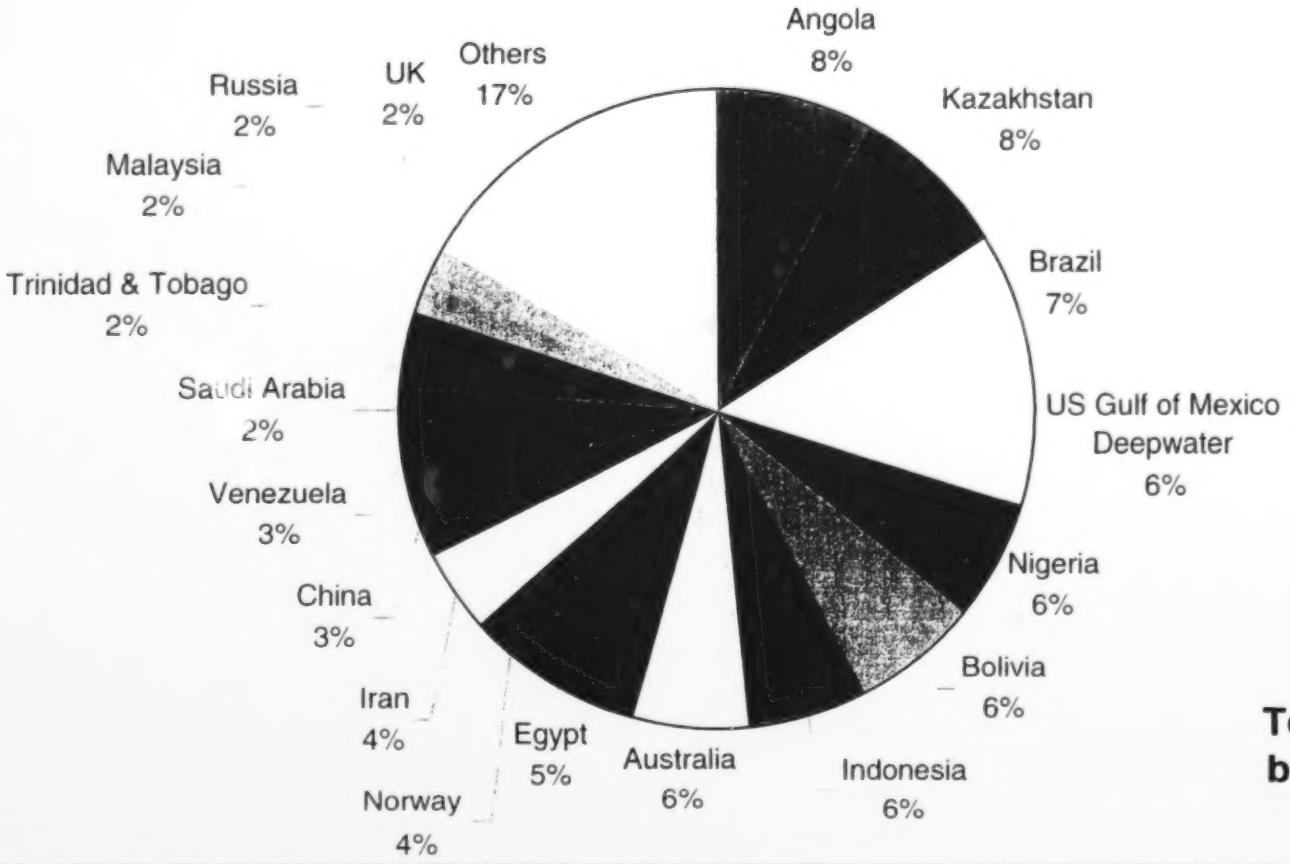
Deepwater Contribution to Global Exploration Results – Oil



Deepwater Contribution to Global Exploration Results – Gas

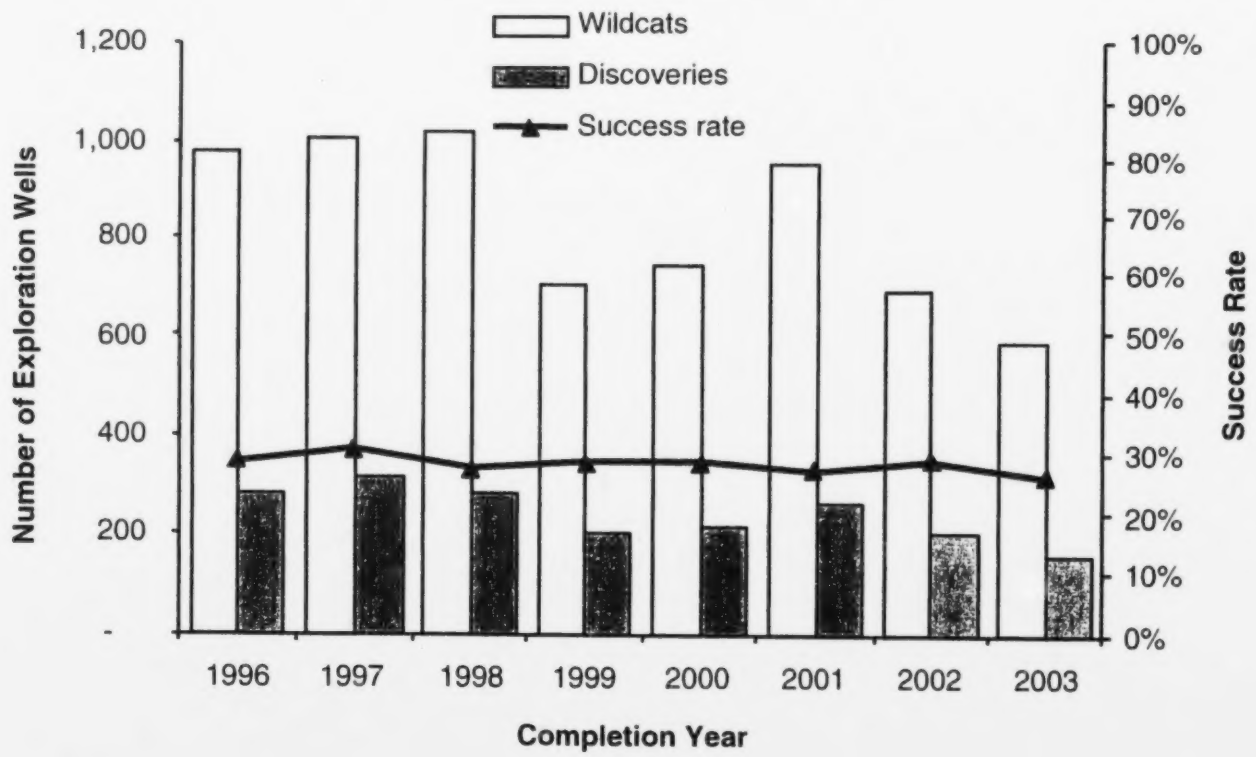


Location of New Discoveries (1996-2003)

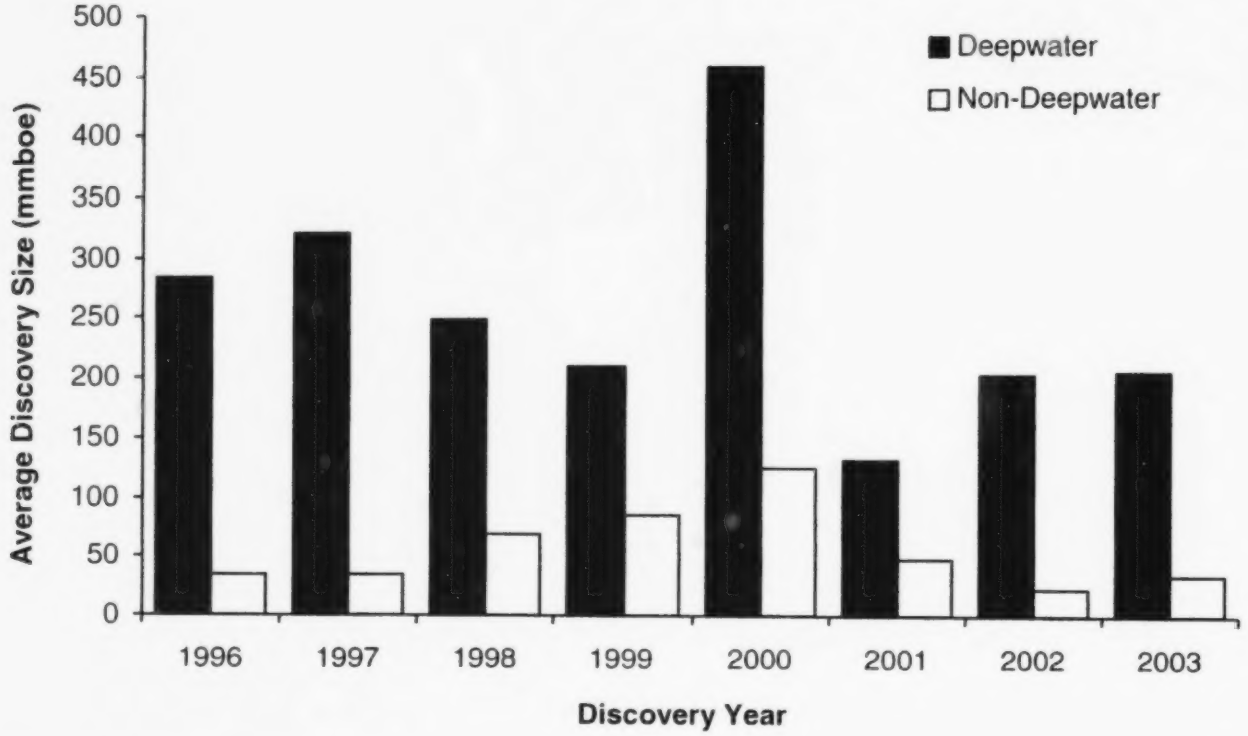


Total = 148 billion boe

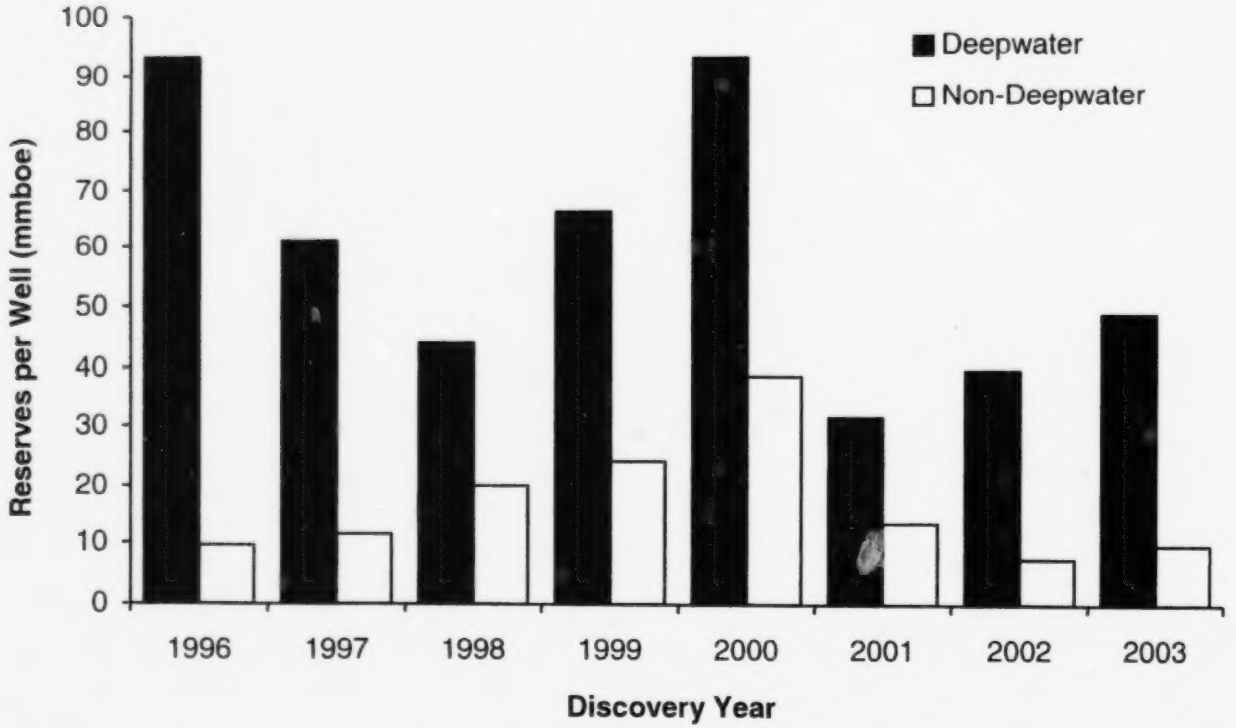
Global Exploration Well Success Rates



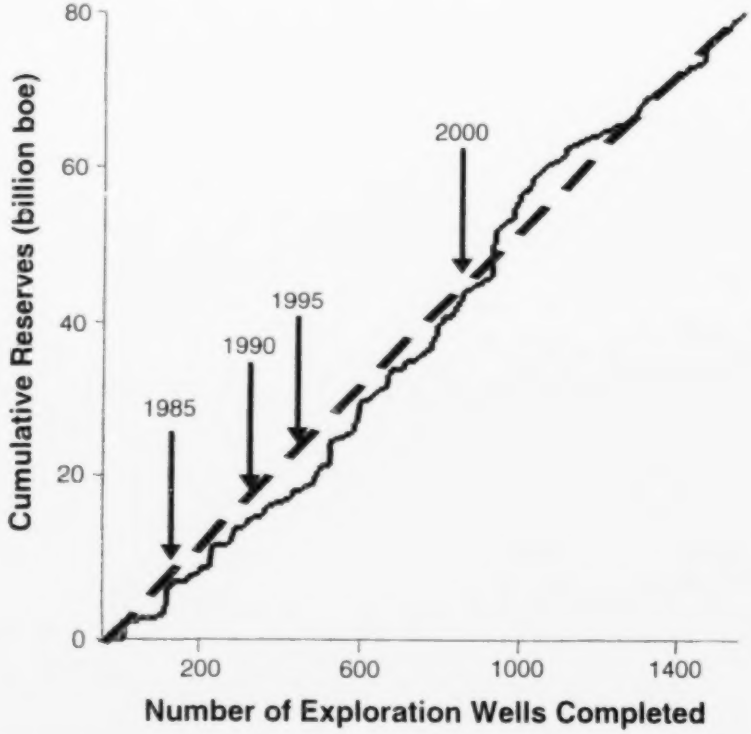
Average Discovery Size

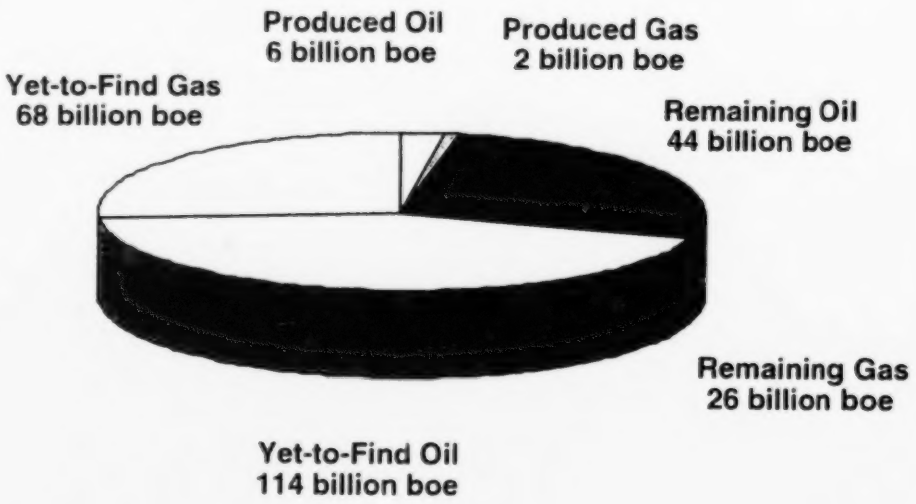


Reserves Discovered per Exploration Well



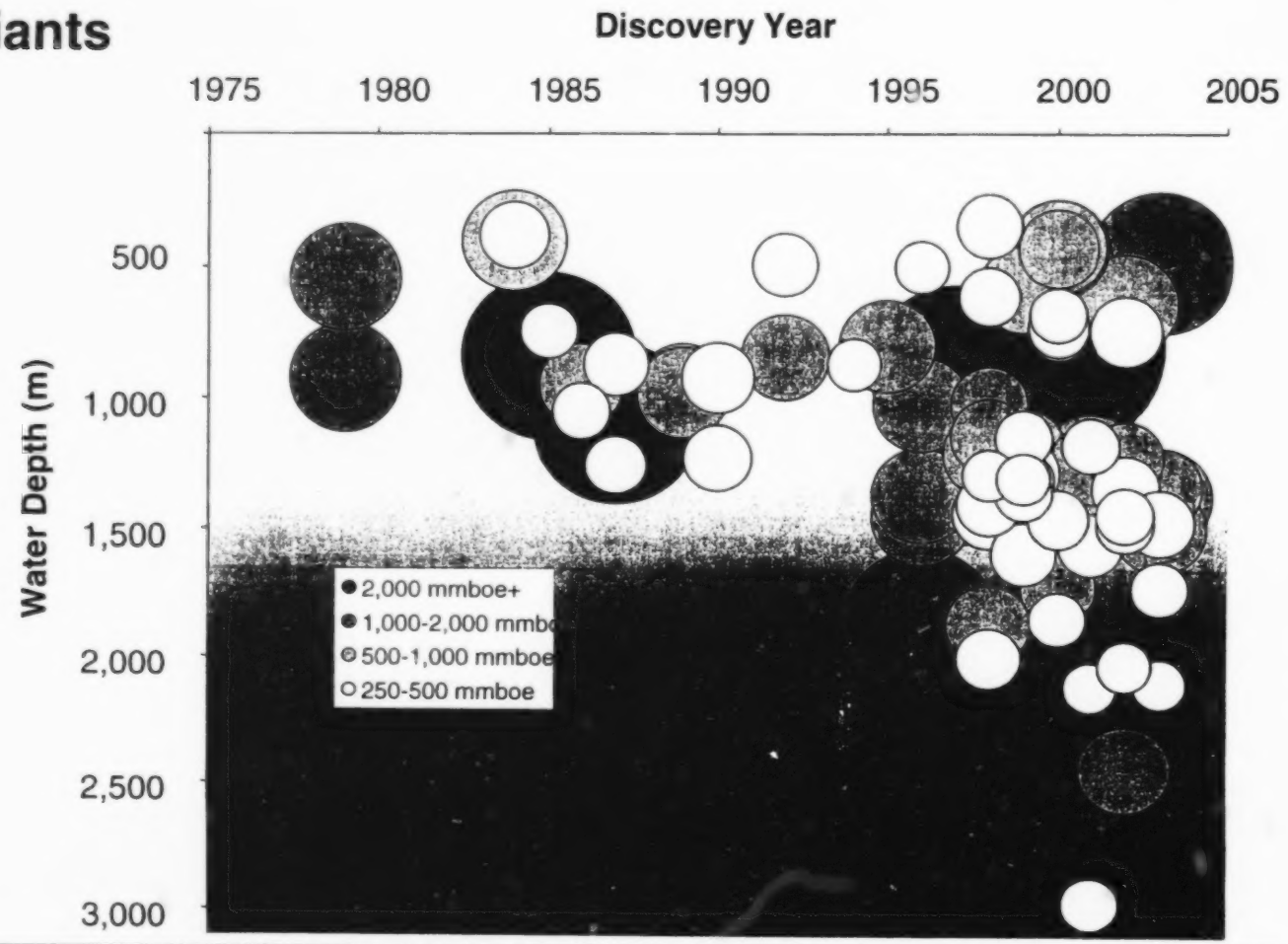
And there looks to be plenty of life in deepwater yet



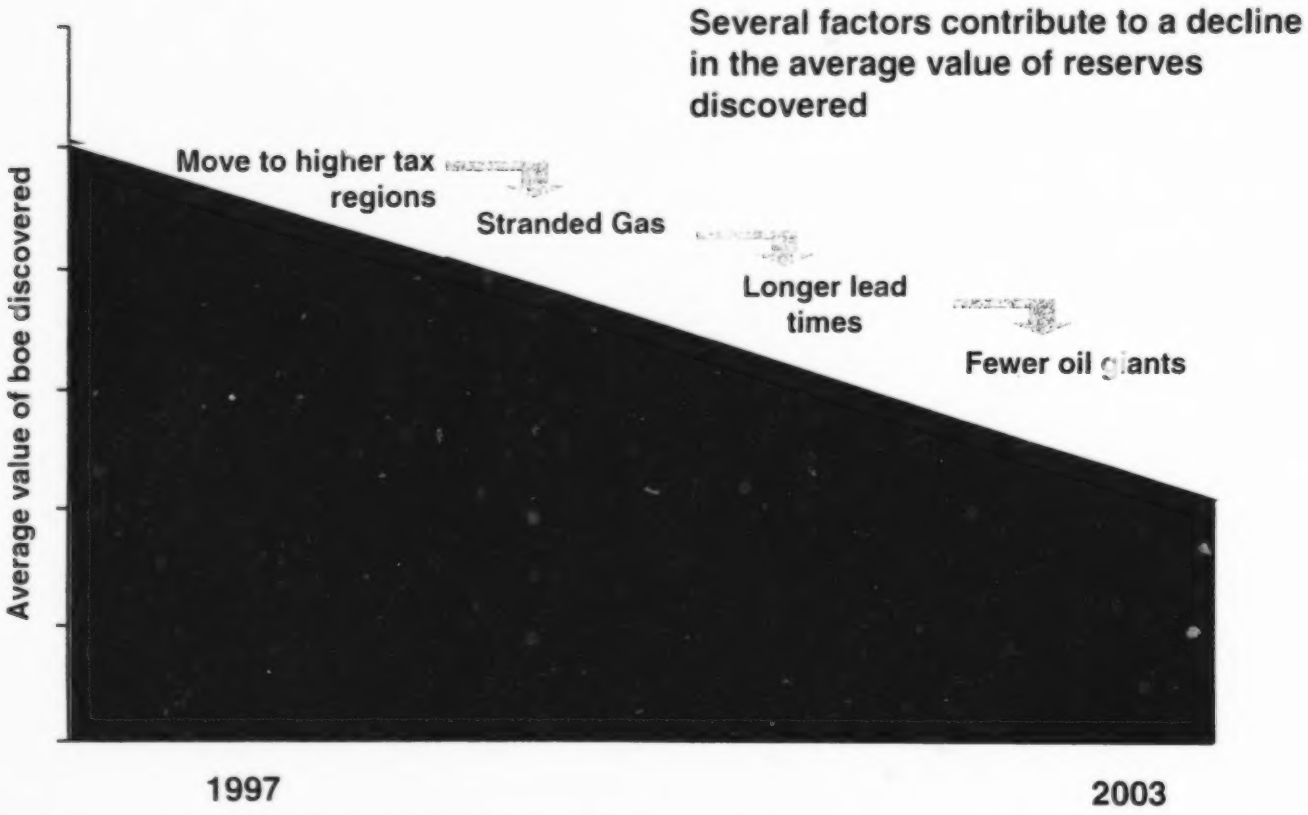


Source: *The Future of Deepwater*
Wood Mackenzie & Fugro Robertson

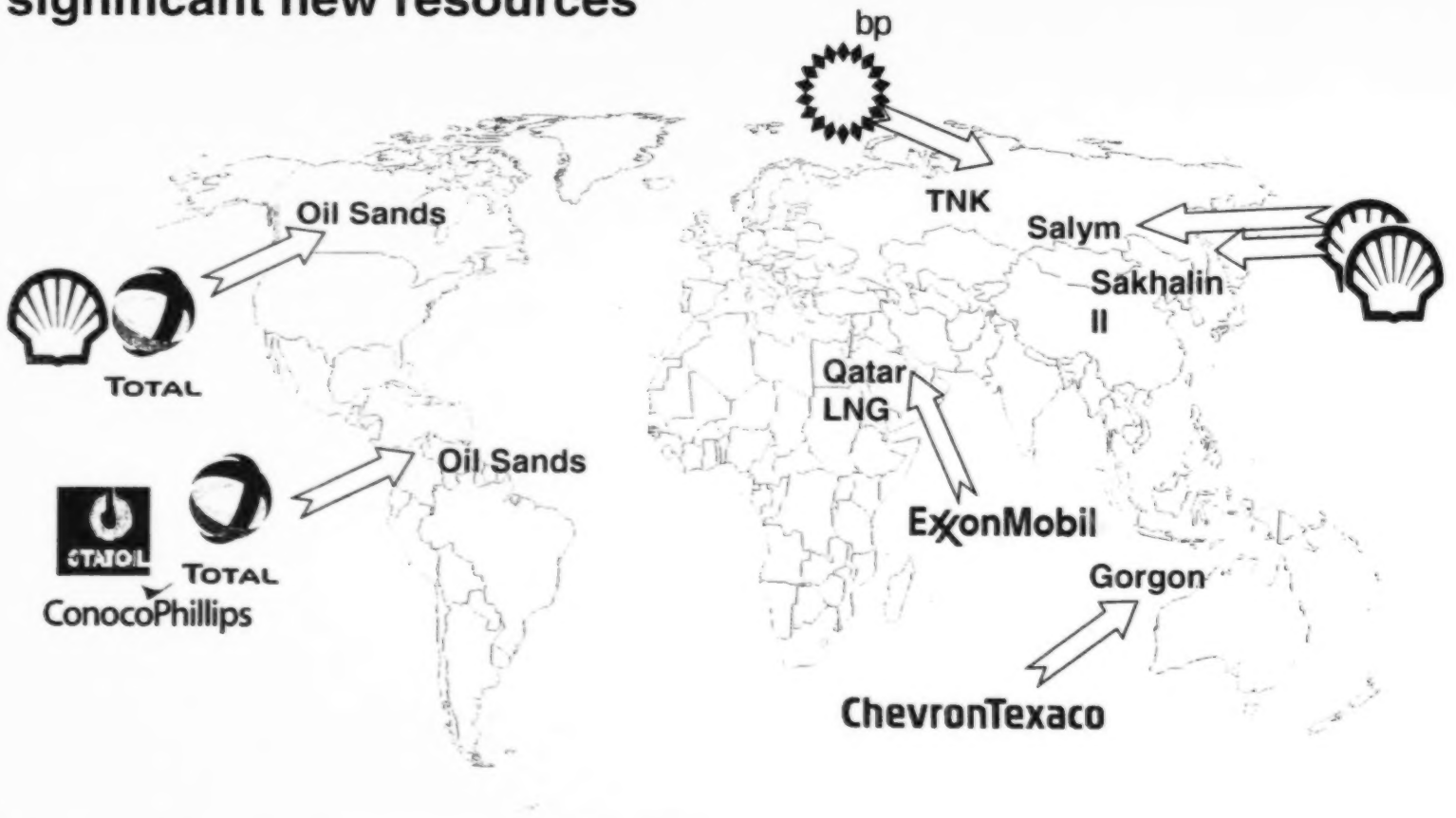
Deepwater Giants



However, the quality of new reserves is a real challenge


Several factors contribute to a decline in the average value of reserves discovered
Move to higher tax regions
Stranded Gas
Longer lead times
Fewer oil giants
Average value of boe discovered
1997
2003

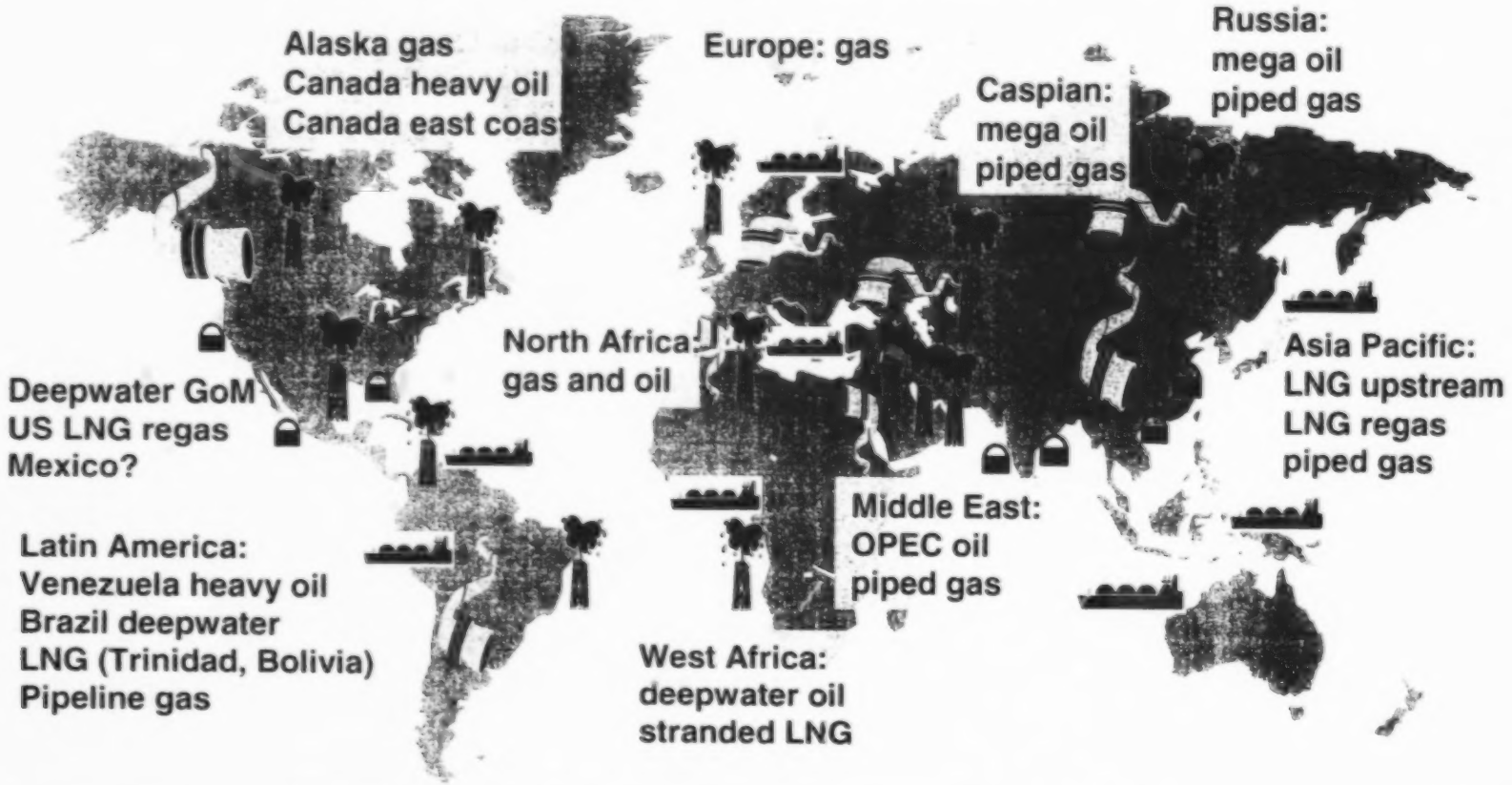
There has been a strategic shift amongst the majors to access significant new resources



This will continue

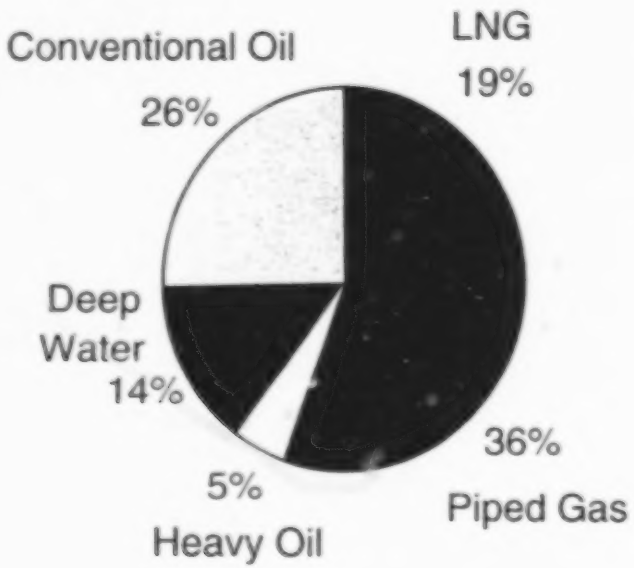
The majors are advantaged through financial muscle and access to markets

The largest upcoming oil and gas capital investments - tomorrow's legacy assets - are located in many different regions



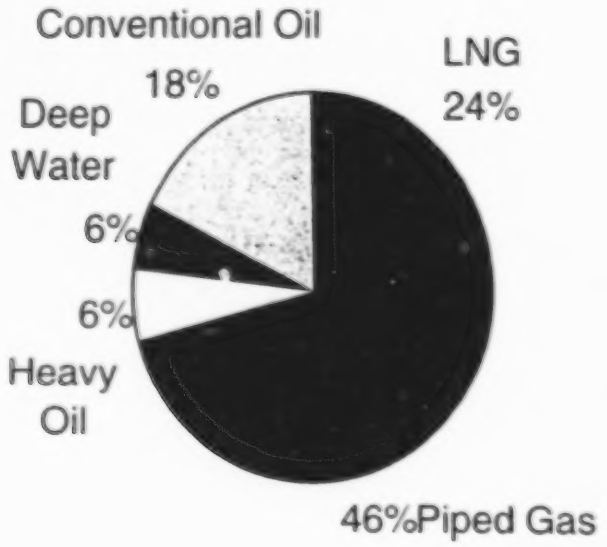
The majority of these new legacy assets are gas, either piped or shipped as LNG

Future capital expenditure... significant investment required



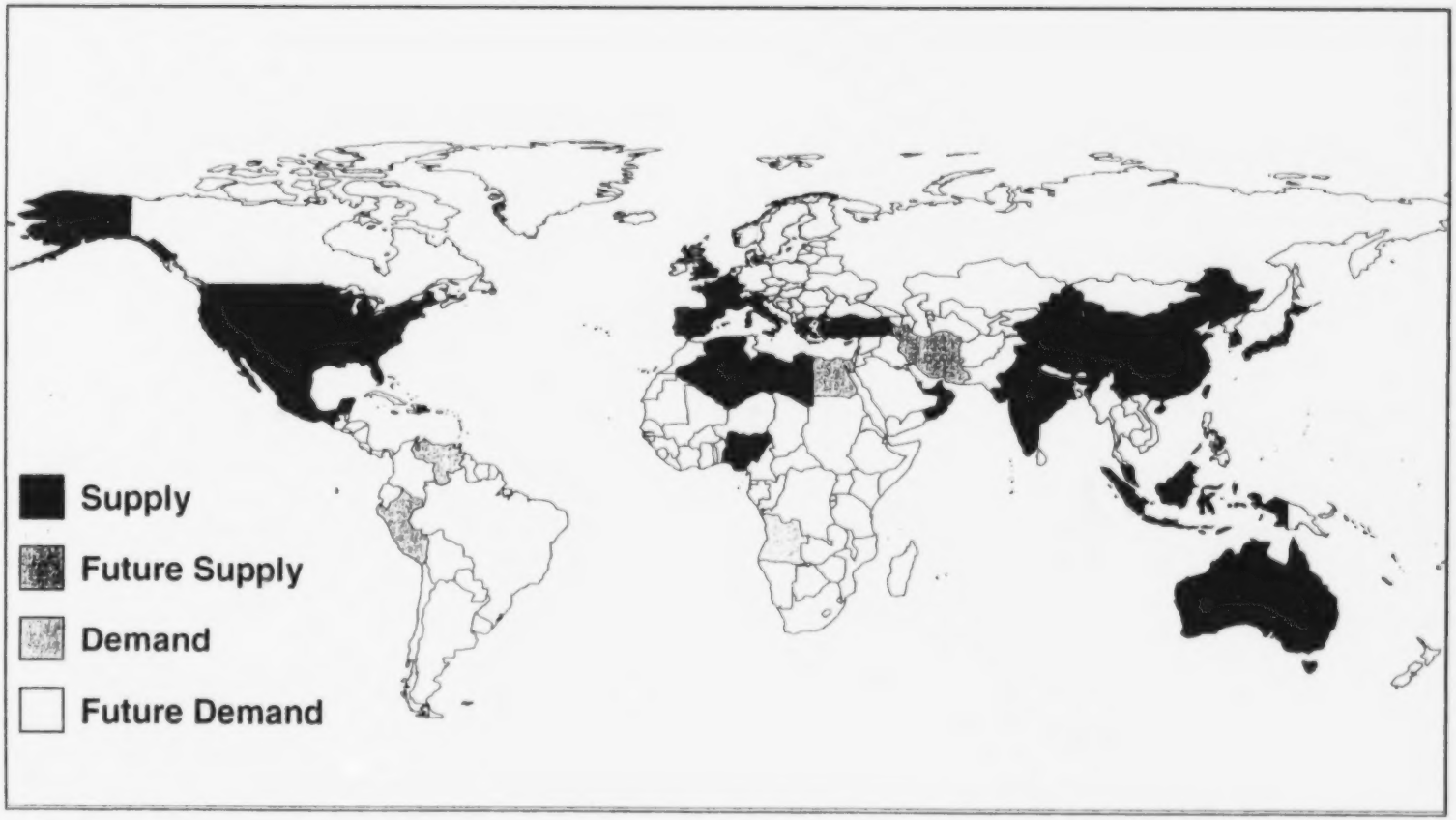
Total Capex ~ $250bn

Oil and gas reserves... the potential is considerable



Total Reserves ~ 170 bn boe

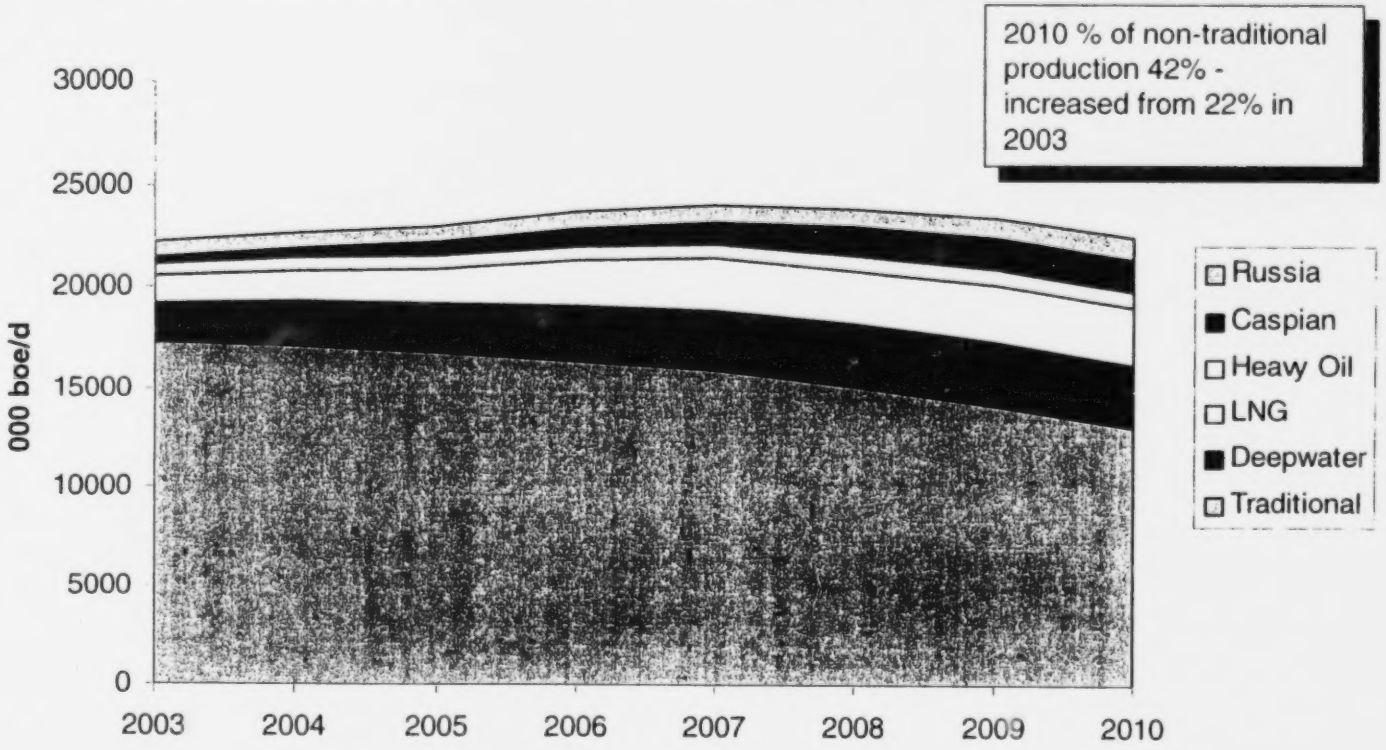
Global LNG



Changing Trends in Production

- The period 2003-2010 and beyond will mark a significant shift towards "new" areas of production
- The most significant shifts will be in the areas of LNG production and production from deepwater areas
- This trend is expected to continue beyond 2010 as the long-term nature of the resource base in the new areas holds up well against the underlying decline in traditional areas (2015 = 53%)
- Upside on the overall numbers beyond 2007 as new projects are brought forward but shift could be even more towards "new" areas on current trends

The majors' focus is moving away from traditional areas



Companies ExxonMobil, BP, Shell, ChevronTexaco, Total, ConocoPhillips. Deepwater includes US GoM, Angola, Nigeria

NOVA SCOTIA BUSINESS INC./ OFFICE OF ECONOMIC DEVELOPMENT

Office of
Economic Development
Chief Executive Officer

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Our file number:

NOVA SCOTIA

June 13, 2006

Michel Samson, MLA
Chairman
Standing Committee on
Economic Development
Legislative Committees Offices
PO Box 2630, Station M
Halifax, NS B3J 3N5

Dear Mr. Samson:

It was a pleasure for my staff and I to meet with your committee on May 17, 2005.

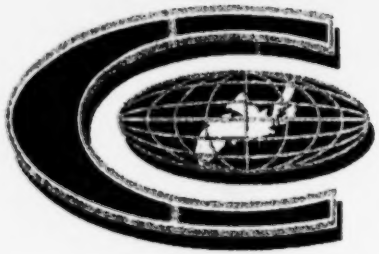
I am pleased to provide a detailed report on the performance of the Small Business Financing/Loan Guarantee Program. As requested, this information was provided by the Nova Scotia Cooperative Council and details activity by region and Credit Union throughout the entire province from the program inception until June 1, 2005.

I trust this is as you require. Should there be further questions or clarification, please contact me at your convenience.

Yours truly,

Paul F. Taylor
Chief Executive officer

Attachment.



Nova Scotia Co-operative Council

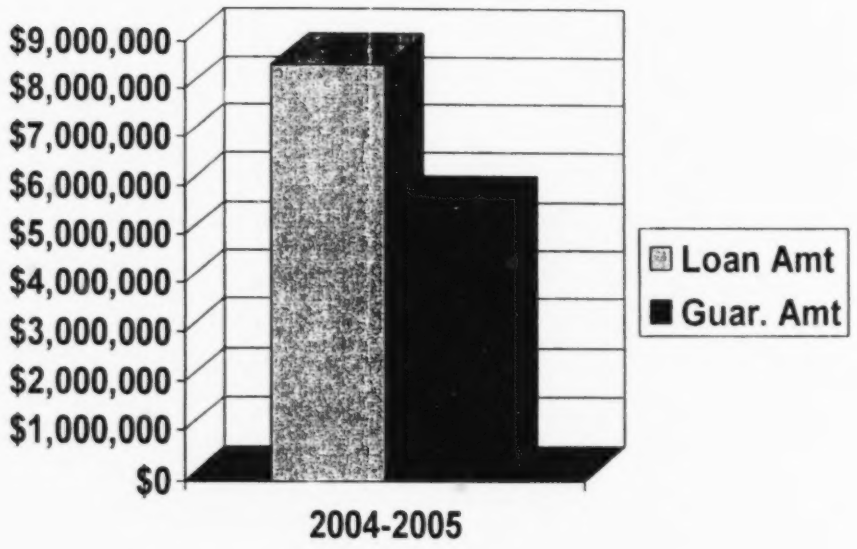
MAKING A DIFFERENCE IN NOVA SCOTIA COMMUNITIES

Small Business Financing/ Loan Guarantee Program

Loan Totals

Total Loans = 122 = $8,499,967.73

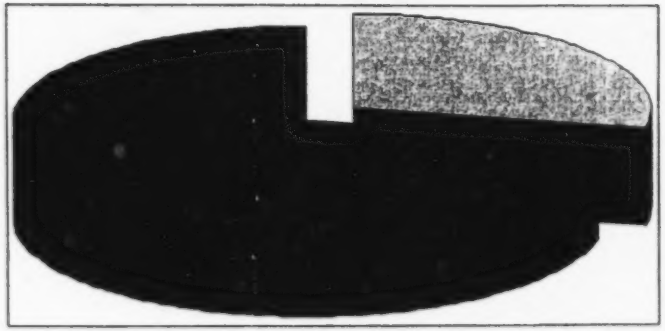
Total Guaranteed Amount = $5,542,446.07



Jobs

Total Current Jobs Maintained: 602

Total New Jobs Created: 239



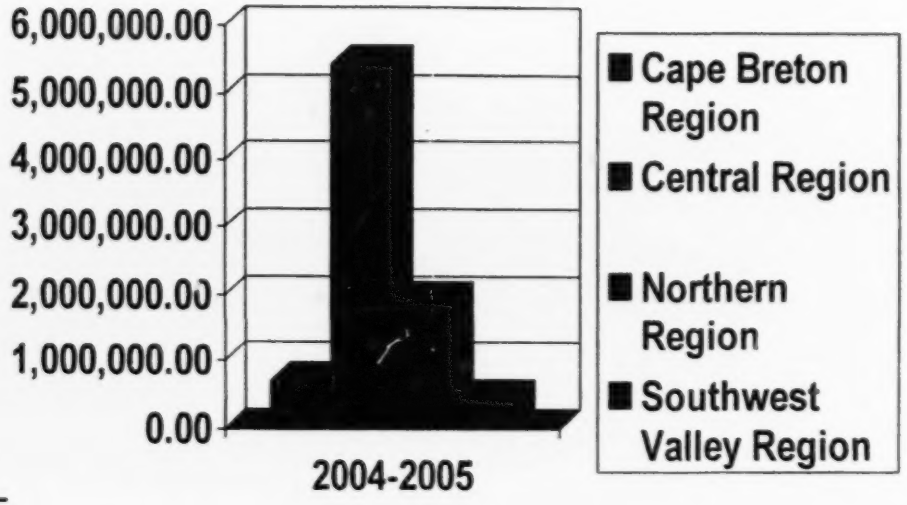
Loans by Region

Cape Breton Region =
$706,950.00

Central Region =
$5,435,567.00

Northern Region =
$1,917,260.73

Southwest Valley Region =
$440,190.00



Loans by Credit Unions

- ☺ Bergengren Credit Union = $557,000.00
- ☺ Community Credit Union = $1,360,260.73

} Northern Region

- ☺ Caisse Populaire de Clare = $152,240.00
- ☺ Coastal Financial = $137,950.00
- ☺ East Coast Credit Union = $100,000.00

} Southwest Valley Region

- ☺ Credit Union Atlantic = $2,525,717.00
- ☺ Heritage Credit Union = $1,660,150.00
- ☺ iNova Credit Union = $ 428,000.00
- ☺ Nova Scotia Postal Employees = $701,700.00
- ☺ Victory Credit Union = $270,000.00

} Central Region

- ☺ Princess Credit Union = $125,000.00
- ☺ St. Joseph's Credit Union = $81,950.00
- ☺ Sydney Credit Union = $400,000.00

} Cape Breton Region

Defaults/Arrears

Defaults = 2

Arrears = 4

Nova Scotia **Business** Inc.

Office of the President & CEO

July 20, 2005

Mr. Michel Samson
Chair
Standing Committee on Economic Development
Legislative Committees Office
3rd Floor, Dennis Building
1740 Granville Street
PO Box 2630, Station M
Halifax, NS
B3J 3N5

Dear Mr. Samson:

We appreciated the opportunity to meet with the Standing Committee on Economic Development on May 17, 2005.

During our discussions, and as noted in your letter dated June 1, 2005, NSBI undertook to provide some additional information to Committee Members. We are pleased to provide the following in that regard:

1. NSBI's activity in the Annapolis Valley region.

Following is a breakdown of NSBI clients by region for fiscal 2003/04:

Southern Region	17.3%
Annapolis Valley	21.4%
North Shore	17.9%
Cape Breton	20.2%
Halifax	23.2%

As you can see, our clients in the Annapolis Valley region accounted for just over 21% of our clients province-wide. Please note that a similar breakdown for fiscal 2004/05 is being compiled as part of our Annual Report.

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Please also find attached a more detailed list of NSBI's accounts and completed transactions in the Annapolis Valley region. This list is divided into two sections:

- Accounts managed by our Financial Services Division
  - Please note that this list includes several accounts inherited by NSBI from predecessor organizations, which NSBI continues to manage.
  - These transactions could be in the form of working capital, equity, capital asset, etc.

- Transactions managed by our Business Development Division
  - This list includes all transactions in which NSBI has been involved since inception.
  - Most of these transactions were in the form of payroll rebates. In some cases funding was provided by NSBI; in other cases NSBI acted as the lead on the projects but financing was provided by the Office of Economic Development.

In order to get an accurate picture of our activity, though, it must be noted that NSBI is much more than a financial institution. We provide a range of services to Nova Scotia businesses that are not reflected in this list of accounts and completed transactions. NSBI is actively engaged in the Annapolis Valley region with our business growth services, including both business advisory and export services. Jamie Whitty is NSBI's Business Advisory team member in the Annapolis region. Jamie works with companies across the region with an emphasis on expanding those businesses and encouraging exports.

2. Breakdown of the number of jobs created and/or maintained through transactions involving NSBI and the location of those jobs.

NSBI's work with companies since our inception has secured deals that will contribute to the creation and maintenance of more than 12,000 jobs and generate a return on investment of over $44 million to the Province of Nova Scotia. Attached is a breakdown of those transactions to the end of fiscal 2004/05, along with the location of the jobs to be created and/or maintained. Please note that these transactions are often completed in partnership with other organizations. Please also note that the target maximum full-time equivalent count reflected in the final column does not represent the actual number of employees as of today's date; this is a forecast of the target maximum number of full-time equivalents to which the transaction is expected to contribute. These forecasts are adjusted periodically as needed. In most cases these are multi-year transactions in which the jobs accumulate over time.

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3. List of the 700 companies our Business Advisory Team visited last year.

NSBI's Business Advisory Team works actively with businesses in every region of the Province. As we discussed during our appearance before the Committee, last year these six executives held over 700 face-to-face meetings with business owners and managers across the province, with an emphasis on expanding those businesses and encouraging exports. Attached is a list of the companies visited by the Business Advisory Team during the last fiscal year (2004/05).

I trust that this information responds to the Committee's requests. Please feel free to contact me should you require any additional information.

Sincerely,

Stephen E. Lund
President & CEO

cc: Paul Taylor, Chief Executive Officer, Office of Economic Development

Annapolis Valley Accounts

I. Financial Services

Accounts	County
Valley Industries Limited	Annapolis
Shaw Wood Industries Limited	Annapolis
Darmos Enterprises International Ltd.	Annapolis
Brocklin Enterprises	Annapolis
Super Clean Steam Mobile Services Limited	Hants
Scotia Slate Products Ltd.	Hants
Sainte Famille Wines Ltd.	Hants
Nova Scotia Textiles Ltd.	Hants
Minas Basin Pulp & Power Co Ltd.	Hants
Avon Spirit Inc.	Hants
Scotia Farm Services Limited	Kings
Old Orchard Inn Limited	Kings
Mark-Lyn Construction Limited	Kings
Eastern Protein Foods Ltd.	Kings
Aurora Inn	Kings
Apple Valley Foods	Kings
ACA Cooperative Ltd.	Kings

Total Portfolio Value	$153,297,000
Annapolis Valley Portfolio Value	$21,036,568

II. Business Development

Account	County
KLJ Field Services	Hants
Convergys (Cornwallis)	Annapolis
Weavexx *	Kings
Frito-Lay Canada *	Kings
Lassonde/Great Valley *	Kings

Total amount authorized:	$6,625,000
% of completed Business Development projects:	17%

** Note: While NSBI was the lead on these projects, financing was secured through the Office of Economic Development.*

JOBS CREATED/MAINTAINED
To Fiscal 2004/05 *

	Location	Industry	Purpose	Target Maximum FTEs New and Maintained **
F' 02 Nov 6, 2001 - Mar 31, 2002				
Bell Bay Golf	Victoria Co	Tourism	Financing	40
diaphonics	HRM	IT	Financing	20
Hershey Canada Inc	HRM	Food Processing	Financing	578
River's Bend Wood Prod	Antigonish	Manufacturing	Financing	12
Scotian Halibut Limited	Shelburne/Yarmouth	Fisheries	Financing	70
Solutioninc	HRM	IT	Financing	35
Subtotal				**755**
F' 03 Apr 1, 2002 to Mar 31, 2003				
Agricultural Enterprises	Colchester	Manufacturing	Financing	10
Apple Valley Foods	Kings	Food Processing	Financing	90
Kytogenics	HRM	Life Sciences	Financing	6
Holdright Lumber (& amendment)	Queens	Manufacturing	Financing	34
Laurie's Motel	Inverness	Tourism	Financing	20
Ocean Nutrition	Inverness	Life Sciences	Financing	510
Oxford Frozen Foods	Cumberland	Food Processing	Financing	17
Pure Energy Battery Inc	Cumberland	Manufacturing	Financing	100
Scotia Slate	Hants	Manufacturing	Financing	13
eCRM Networks	HRM	Knowledge Based	Financing	7
IMP Group Ltd	HRM	Aerospace	Financing	900
Navitrak	HRM	Knowledge Based	Financing	22
Oceanstone Inn	HRM	Tourism	Financing	7
Highland Heights	Victoria	Tourism	Financing	17
Xerox Canada	HRM	Contact Centre	Payroll Rebate	200
KLJ Field Services	Hants	Contact Centre	Payroll Rebate	95
Doppelganger Canso	Guysborough	Contact Centre	Payroll Rebate	54
Teletech	HRM/Cumberland	Contact Centre	Payroll Rebate	1495
Convergys Truro	Colchester	Contact Centre	Payroll Rebate	782
Subtotal				**4379**
F' 04 Apr 1, 2003 to Mar 31, 2004				
NSBI TRANSACTIONS/DEALS				
Urban Pouch Pack	HRM	Manufacturing	Financing	10
McNamara Polango	Lunenburg	Manufacturing	Financing	11
Seanse Fisheries	HRM	Fisheries	Financing	26
Novalis	HRM	IT	Financing	100
Old Orchard	Kings	Foundation	Financing	105
A.F. Thenault	Digby	Manufacturing	Financing	150
Scanwood Canada	HRM	Manufacturing	Financing	225
Unique Solutions	HRM	IT	Financing	47
MacLeod Resources	Inverness	Foundation (Mining)	Financing	24
Survival Systems	HRM	Manufacturing	Financing	17
3D AutoParts	Colchester	Manufacturing	Financing	9
Hershey Canada	HRM	Manufacturing	Payroll Rebate	272
Staples	HRM	Contact Centre	Payroll Rebate	145
On-Line Support	HRM	Contact Centre	Payroll Rebate	500
Minacs	HRM	Contact Centre	Payroll Rebate	300
EPC Industries	Cumberland	Manufacturing	Payroll Rebate	70
Keane	HRM	Application Development	Payroll Rebate	175
Amex	HRM	Contact Centre	Payroll Rebate	185
Torstar	Colchester	Contact Centre	Payroll Rebate	225
EDS	Inverness	Contact Centre	Payroll Rebate	325
Convergys Cornwallis	Digby/Annapolis	Contact Centre	Payroll Rebate	500
Lightbridge	Queens	Contact Centre	Payroll Rebate	280
Cape Breton Castings	Cape Breton	Contact Centre	Payroll Rebate	110
OTHER				
Weavexx	Kings	Manufacturing	NSBI Project Mgmt/OED Assistance	174
Subtotal				**3985**
F' 05 Apr 1, 2004 to Mar 31, 2005				
NSBI TRANSACTIONS/DEALS				
Nova Scotia Textiles	Hants	Manufacturing	Financing	55
eCRM Networks	HRM	IT	Financing	2
Federal Gypsum	Richmond	Manufacturing	Financing	80
Inland Technologies	HRM	Manufacturing	Financing	33
Dynagen	Cape Breton	Manufacturing	Financing	50
Techlink	Cape Breton	IT	Financing	72
MacTara	HRM	Manufacturing	Financing	210
Clarke	HRM	Head Office	Payroll Rebate	95
Foreign Exchange Transactions	HRM	Life Sciences	Payroll Rebate	60
Crossley Carpets	Colchester	Manufacturing	Payroll Rebate	513
CGI	HRM	IT	Payroll Rebate	837
PharmEng	Cape Breton	Life Sciences	Payroll Rebate	300
SupportSoft	HRM	IT	Payroll Rebate	85
Versata	HRM	IT	Payroll Rebate	85
OTHER				
C-Vision	Cumberland	Manufacturing	NSBI Project Mgmt/OED Assistance	100
Bear Head LNG (Anadarko)	Richmond	Energy	NSBI Project Management	42
Frito-Lay	Kings	Food Processing	NSBI Project Mgmt/OED Assistance	159
Lasonde/Great Valley	Kings	Food Processing	NSBI Project Mgmt/OED Assistance	51
CONSTRUCTION				
Bear Head LNG (Anadarko)	Richmond	Construction	NSBI Project Management/Land	440
EXPORT				
$30.3M in incremental exports equals 337 new positions ($30.3M / $90K)	Province-wide	All industries	Export Development	337
BUSINESS ADVISORY				
Aggregate of 7 projects for 79 jobs maintained	Province-wide	All industries	Business Advisory Services	79
Subtotal				**3685**
TOTAL NEW & MAINTAINED				**12804**

NOTES:

* These transactions are often completed in partnership with other organizations

** Target maximum FTEs does not represent the actual number of employees as of a particular date; this is a forecast of the target maximum FTEs to which the transaction is expected to contribute

*** These forecasts are adjusted periodically as needed. In most cases, these are multi-year transactions in which the jobs accumulate over time

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